HMMWV Egress Assistance Trainer (HEAT) Instructor/Operator (I/O) Training Support Package



TRAINING SUPPORT PACKAGE (TSP)

TSP Number / Title	551-HEAT / High Mobility Multipurpose Wheeled Vehicle (HMMWV) Egress Assistance Trainer (HEAT)
Effective Date	1 April 2007
Supersedes TSP(s) / Lesson(s)	
TSP Users	ANCOC, BNCOC, BOLC, Unit Training
Proponent	The proponent for this document is the Transportation School.
Improvement Comments	Users are invited to send comments and suggested improvements on DA Form 2028, Recommended Changes to Publications and Blank Forms. Completed forms, or equivalent response, will be mailed or attached to electronic e-mail and transmitted to: U.S. Army Combined Arms Support Command Transportation Training Division 401 1st Street Suite 227 Fort Lee, VA 23801-1511 e-mail: asat-lee@lee.army.mil
Security Clearance / Access	Unclassified
Foreign Disclosure Restrictions	FD5. This product/publication has been reviewed by the product developers in coordination with the Fort Lee, Va foreign disclosure authority. This product is releasable to students from all requesting foreign countries without restrictions.

PREFACE

Purpose

This Training Support Package provides the instructor with a standardized lesson plan for presenting instruction for: The Army standardized training program for the HMMWV Egress Assistance Trainer (HEAT).

This TSP Contains

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High Mobility Multipurpose Wheeled Vehicle (HMMWV) Egress Assistance Trainer (HEAT) 551-HEAT / Version 1.0 1 Apr 2007

SECTION I.	ADMINISTRATIVE D	ATA
All Courses Including This Lesson	Course Number	<u>Version</u> <u>Course Title</u>
Task(s) Taught(*) or Supported	Task Number	<u>Task Title</u>
Reinforced Task(s)	Task Number 071-326-0502 071-326-0503 071-326-3002 071-326-3013 071-329-1030 071-410-0002 081-831-0101 081-831-1040 081-831-1040 081-831-1041 113-571-1022 113-637-2001 551-721-1359 551-721-1361 551-721-1410 551-721-2408 805C-PAD-2060 850-001-3001	Task Title Move Under Direct Fire Move Over, Through, or Around Obstacles (Except Minefields) React to Indirect Fire While Mounted Conduct a Tactical Road March Navigate From One Point on the Ground to Another Point While Mounted React to Direct Fire While Mounted Request Medical Evacuation Evaluate a Casualty Transport a Casualty Using a One-man Carry Transport a Casualty Using a Two-man Carry or an Improvised Litter Perform Voice Communications Communicate Via a Tactical Radio in a Secure Net Operate a Vehicle in a Convoy Operate Vehicle Under Adverse Conditions Read Strip Maps Implement Defensive Procedures When Under Attack/Ambush in a Truck Convoy Report Casualties Employ Accident Prevention Measures and Risk Management Process Control Mission Safety Hazard
Academic Hours	Test Test Review Total Hours:	Resident Hours/Methods 3 hr 30 mins / Conference / Discussion 1 hr 30 mins / Conference/Demonstration 1 hr 30 mins / Practical Exercise (Performance) 1 hrs 0 hrs 7 hrs 30 mins
Test Lesson Number		Hours Lesson No.
HAIIIDEI	Testing (to include test r	review) <u>N/A</u>
Prerequisite Lesson(s)	<u>Lesson Number</u> None	<u>Lesson Title</u>
Clearance	Security Level: Und	classified

Access

Requirements: There are no clearance or access requirements for the lesson.

Foreign Disclosure Restrictions FD5. This product/publication has been reviewed by the product developers in coordination with the Fort Lee, VA foreign disclosure authority. This product is releasable to students from all requesting foreign countries without restrictions.

References

			Additional Information
Number	Title	Date	Additional information
AR 385-40	Accident Reporting and Records	01 Nov 1994	
AR 385-55	Prevention of Motor Vehicle Accidents	12 Mar 1987	
CALL HANDBOOK #06-31	Uparmored HMMWV Rollover Prevention and Egress Trainer	01 Aug 2006	
CFLCC TC 21-305-4.1	Tactics, Techniques and Procedures (TTPs), Program of Instruction (POI), and Crew/Battle Drills for High Mobility Multipurpose Wheeled Vehicle (HMMWV) Egress Assistance Trainer (HEAT).	27 Feb 2006	
DA PAM 385- 1	Small Unit Safety Officer/NCO Guide	29 Nov 2001	
FM 21-305	Manual for the Wheeled Vehicle Driver (AFMAN 24- 306)	27 Aug 1993	
FM 4-01.45	Multi-Service Tactics, Techniques, and Procedures for Tactical Convoy Operations MCCRP 4-11.31H; AFTTP(I) 3- 2.58; NTTP 4-01.3	24 Mar 2005	
FM 5-19	Composite Risk Management	21 Aug 2006	
GTA 55-03- 030	Emergency Procedures (Rollover Drills)	01 Oct 2006	
TC 21-305	Training Program for Wheeled Vehicle Accident Avoidance	19 Aug 1996	
TC 21-305-4	Training Program for the High Mobility Multipurpose Wheeled Vehicle	31 May 1991	
TC 55-HEAT	Training Program for the HMMWV Egress Assistance Trainer (HEAT)	TBD	
TM 9-2320- 280-10	Operator's Manual for Truck, Utility: Cargo/Troop Carrier, 1- 1/4 Ton, 4X4, M998; M998A1; Truck, Utility: Cargo/Troop Carrier, 1-1/4 Ton, 4X4, w/Winch, M1038; M1038A1; Truck, Utility: Heavy Variant, 4X4, M1097; M1097A1; M1097A2; Truck, Utility	31 Jan 1996	
TM 9-2320- 387-10	Operator's Manual for Truck, Utility: S250 Shelter Carrier, 4X4 M1113, Truck Utility: Up- Armored Carrier, 4X4, M1114,	17 Oct 1997	

Student Study Assignments None

Instructor Requirements

HEAT operators must be trained and certified by competent personnel. As such, commanders must determine who is qualified to train the HEAT operator(s). Commanders may assign other competent personnel (military, civilian technician, or contractors) as HEAT I/Os. Ideally, someone who is already a driver trainer or has experience as an instructor or safety officer/NCO may be designated by the commander as a HEAT I/O. I/O's must be selected not only for their technical qualifications but also for their demonstrated performance, objectivity, and ability to observe and provide constructive comments. Qualification training for HEAT I/Os will be conducted using the following guidance:

- a. Individuals conducting HEAT training must be trained and certified by a HEAT I/O.
- b. Initial qualification training will consist of, as a minimum, hands-on training of all tasks the operator is authorized to perform. Special emphasis will be placed on Academic and Performance Phase Learning Objectives and appropriate PMCS. Annually, all HEAT operators and HEAT I/Os must demonstrate a working knowledge and understanding of the appropriate subject areas in the HEAT Training Manuals and the ability to administer the commander's HEAT training program.
- c. The initial/annual evaluation will determine the HEAT operator's ability to train other personnel and perform essential tasks to the prescribed standards. HEAT I/Os may evaluate the HEAT operator(s) by observing the performance of the prescribed duties or by functioning as a crewmember undergoing HEAT training by the HEAT operator, in order to evaluate the effectiveness of the HEAT operator's instruction.
- d. HEAT I/Os will be issued a DD Form 1902, Certificate of Qualification as evidence of their qualification and designation and training must be annotated on operator's DA Form 348.

Additional Support Personnel Requirements

	<u>Stu</u>		
<u>Name</u>	<u>Ratio</u>	<u>Qty</u>	<u>Man Hours</u>
Combat Life Saver (Enlisted)	1:15	1	2 hrs

Equipment Required for Instruction

<u>ld</u> <u>Name</u>	Stu Ratio	Instr Ratio	<u>Spt</u>	<u>Qty</u>	<u>Exp</u>
4130-01-458-8679 HAZARDOUS WASTE VAC			No	1	Yes
4240-01-433-8719 Goggles, Safety, Fog-Free	1:5		No	0	Yes
4720-01-168-0609 HOSE ASSEMBLY, WATER			No	1	Yes
*55-62 High Mobility Multipurpose Wheeled Vehicle (HMMWV) Egress Assistance Trainer (HEAT)	1:25		No	0	No
6515-01-371-6418 GLOVES, UTILITY, MEDICAL			No	10	Yes
7240-00-160-0438 CAN, TRASH AND GARBAGE			No	1	Yes

	8465-00-254-88 WHISTLE, BAL				Yes	1	Yes
	* Before Id indic	cates a TADSS					
Materials Required	Instructor Materials: This TSP, TC 55-HEAT						
	Student Materials: HEAT trainees will report wearing boots, Army combat uniform/desert combat uniform, protective eye wear (mandatory), helmet, body armor, personal and any crew-served weapon(s), protective masks (as required by the unit), LBE/V, and any other equipment that would typically be worn while riding in an uparmored HMMWV in a combat zone. It is also suggested HEAT participants wear knee and elbow pads during training.					v-served equipment oat zone. It	
Classroom, Training Area, and Range Requirements	General Instru	uction Building					
Ammunition Requirements	<u>ld</u> <u>Name</u> None		<u>Ехр</u>	Stu Rat		<u>str</u> atio	Spt Qty
	None NOTE: Before	presenting this lesson, instructors m			R	atio	
Requirements Instructional	None NOTE: Before and ide All Students n must then be the start of tra	ntifying reference material. nust fill out the HEAT Training Previewed by the instructor and foining.	ust thoro	oughly pre nt Screer d if neces	pare by ning Sh	studyin eet. Ti	g this lesson nis form oval prior to
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SECTION II. INTRODUCTION

Method of Instruction: Conference / Discussion
Instructor to Student Ratio is: 2:15
Time of Instruction: 5 mins
Media: Large Group Instruction (LGI)

Motivator

SHOW SLIDE 1: An AMSAA study of HMMWV rollover accidents at the end of FY 05 revealed that "During the two years that has defined OIF/OEF there have been (34) Class A rollovers. During the entire (18.5) year span of the HMMWV data ... there have only been (30) class A rollovers." The same study also found that OIF/OEF HMMWV accident rates are 12 to 42 times greater than non-OIF/OEF. A study reported by *Helicopter World* (now *Defense Helicopter*) magazine in September 2000 said a person who is "egress trained" stands a 250 percent greater chance of survival than an untrained occupant when faced with a rollover egress emergency.

Teaching Soldiers, under controlled training conditions, the proper procedures to egress from an inverted high mobility multipurpose wheeled vehicle (HMMWV) will allow them to achieve self-control and overcome the natural fear and panic following the vehicle rollover. It will also reduce casualties and fatalities resulting from such rollovers, even when the vehicle is under attack, underwater, or on fire.

Show TRADOC Heat Video (CLICK BOX TO BEGIN MOVIE)

SHOW SLIDE 2:

Terminal Learning Objective

NOTE: Inform the students of the following Terminal Learning Objective requirements. At the completion of this lesson, you [the student] will:

Action:	Acquire certification on HEAT device to become unit Train The Trainer.
Conditions:	Given the HEAT device and required instructional materials.
Standards:	Become proficient on all operations of the HEAT device, pass the hands on portion and attain 70% or higher on the written exam.

Safety Requirements

Safety Note: Of all the vehicle occupants, the likelihood of injury to the gunner is disproportionately higher than those of the others. Knowing the fundamental purpose of the HEAT, those occupying the gunner position must exercise particular diligence in securing occupant restraints, bracing for the rollover, and be particularly mindful of the increased potential for head and neck injuries - even in the device.

Medical pre-screening. HEAT training undertaken while being treated by prescription medications, must be done so with the knowledge and approval of the treating physician.

Safety hazard awareness notice. A potential for a mishap during HEAT training is acknowledged. In order to ensure the safety of staff and HEAT Training

participant(s), the following considerations will be addressed. Be alert for those who appear to be experiencing difficulty. In the event of motion discomfort, the individual – or the unit to which the individual belongs – will be responsible for cleaning the physical evidence (i.e., the release of *any* bodily fluid or compound) of such discomfort before training will continue.

Hazardous conditions and control measures. Students must be informed of any known hazardous conditions and control measures that exist in the training environment. All watches, rings, and jewelry worn around the neck shall be removed; pagers or cell phones removed; and all pockets emptied of contents – particularly pens, pencils and pocket knives. Earrings should be removed to prevent inadvertent tearing of the earlobe during inversion and egress from the device. Crewmembers must be briefed of their responsibility to report any unsafe/unhealthful condition they may discover. The instructor will identify the location of emergency equipment, fire exits, and local procedures to be used in the event of a fire, injury, or other emergency. In the event of an in-HEAT emergency, (three blasts on the whistle or sounding of applicable alarm) exit the HEAT immediately and proceed to the pre-designated location. A single long blast is an indication to remain inside the device and not open the doors.

First aid treatment includes oxygen (O) administration, treatment for shock, Cardiopulmonary Resuscitation (CPR) when needed, and transport to the nearest medical treatment facility IAW the Pre-Mishap Plan (Handout 1).

Pre-training requirements. Prior to engaging in HEAT training, personnel shall be proficient with the wear and operation of standard uniform and combat equipment worn in the theater, and be familiar with survival, signaling and rescue techniques appropriate to survival situations typical of disabled vehicles in the AOR.

Emergency medical personnel. There will be a minimum of one Combat Lifesaver (CLS) on site during any operation of the HEAT. Ideally, CLS services will be provided by the unit undergoing the training. Emergency medical personnel with appropriate equipment and a suitable vehicle for transport will be readily available during all HEAT training. The absence of any criteria in this paragraph requires an additional risk assessment, and the approval of the appropriate risk approval authority.

Safety reminder. All personnel will be reminded that personal injury, death, or equipment damage can result from carelessness, failure to comply with the approved procedures, or violations of warnings, cautions, and safety regulations.

HEAT location safeguards. The HEAT device will be isolated from passers-by to prevent accidental striking by the device when it is in motion.

Risk Assessment Level

Moderate - CRM is a decision-making process used by leaders to mitigate risks associated with all hazards that can injure or kill people, damage or destroy equipment, or otherwise impact mission effectiveness. CRM must be accomplished using appropriate composite risk management worksheet in the Handout section of this TSP prior to the conduct of this training.

Environmental Considerations

NOTE: It is the responsibility of all Soldiers and DA civilians to protect the environment from damage.

Environmental Exposure – Aircrew members should not participate in flight duties for at least eight hours after completion of HEAT training to ensure stability

in the otolith organs (inner ear) of the vestibular system, Aviation/Flight Safety
Program and Aviation Accident Prevention Plan {AAPP}, Para. 4-9d (1); and FM 3-
04.301 Aero Medical Training for Flight Personnel, Chapter 9.

Evaluation

Instructional Lead-In

SHOW SLIDE 3:

Knowing what actions to take immediately prior to a potential rollover and immediately following a rollover are vital to the safety of the vehicle's crew. Rollover battle drills routinely performed by the vehicle's crew, create understanding of the violent chaos that results when a rollover has occurred and develop skills needed to react to it..

SECTION III. PRESENTATION

NOTE: Inform the students of the Enabling Learning Objective requirements.

A. ENABLING LEARNING OBJECTIVE

ACTION:	Understand preventive measures to preclude rollover
CONDITIONS:	In a classroom, provided instruction on preventive and reactive measures, crewman duties and emergency steps to take in case of a vehicle rollover
STANDARDS:	Identify precautionary measures to take to prevent a HMMWV vehicle rollover by answering the check-on-learning questions posed by instructor with a minimum of 80%.

1. Learning Step / Activity 1. Identify Preventive Measures for Vehicle Rollover

Method of Instruction: Conference / Discussion

Instructor to Student Ratio: 2:15
Time of Instruction: 20 mins

Media: Large Group Instruction

SLIDE 4:

The critical rollover angle for a Combat Patrol-loaded M1114 is less than 30°, while the critical rollover angle for an up-armored HMMWV is 25° – less with higher-cg loads. Driving an uparmored HMMWV is vastly different than driving a HMMWV without armor. At gross vehicle weight (GVW), which is an unloaded uparmored HMMWV with four crewmembers and their gear, rapid steering at speeds as low as 40 miles per hour (mph) increases the likelihood of a rollover. Stability is further reduced by road conditions, such as sand, debris, gravel, or rain; overloading the uparmored HMMWV; cargo placed high in the vehicle which raises the vehicle's center of gravity; and driver inexperience or lack of training. Additionally, at 60 mph on smooth dry pavement an overloaded uparmored HMMWV has a braking distance of 15 vehicle lengths, compared to 13 vehicle lengths at GVW.

SLIDE 5: Elaborate on the following

Rollovers are caused by speed, inadequate training, high centers of gravity, terrain and road conditions, driving habits, and local conditions. However, with proper driver training and actions, leader involvement, and composite risk management, the number of rollovers can be significantly reduced.

- a. **Senior vehicle occupant.** The senior occupant is responsible for ensuring all personnel riding in or on a vehicle are wearing seatbelts/restraints and that all required equipment inside the vehicle is properly stored and secured. Other requirements are as follows;
 - (1) Vehicle center of gravity. The height of a vehicle's center of gravity and the length of the wheelbase determine the vehicle's stability. This is a major contributing factor to vehicle rollovers. If the crew overloads the vehicle or does not load the heavier items on bottom, the center-of-gravity

will be raised higher. Every effort should be made to plan and load the vehicle to minimize this affect. If the load is off to one side of the vehicle handling will be adversely affected. This will not only prematurely wear on the vehicle components but will also tend to make the vehicle sluggish to control or drift from side to side.

- (2) Load security. Improperly secured loads can change a vehicle's center of gravity and its stability. Bulk liquid tank trucks are inherently less secure as liquids can surge when trucks brake or go around curves, thereby altering the center of gravity. Also, a vehicle loaded with containers will have a higher center of gravity. It is important that payloads are secured as closely as possible to the lateral centerline of the truck or trailer bed. If the payload is not centered properly, the vehicle stability will not be equivalent when turning to both the right and left.
- (3) Radius of curves and slope of roadways. These calculations are important because they generate a centrifugal force that acts sideways on the vehicle, thereby the hazard of rollover.
- (4) Vehicle speed. This factor probably contributes the most to vehicle instability because it magnifies problems presented by the other three factors. As the vehicle's speed increases, the centrifugal force increases. Faster speeds also result in decreased driver response times. Of all the factors discussed above, the driver exercises control over speed. When maneuvering through curves or sudden traffic situations, a vehicle with a high center of gravity can easily turn over. Sudden vehicle maneuvers are especially risky because the combination of speed and load shift makes the vehicle unstable.
- (5) Trailer towing. Vehicles towing trailers are much more prone to roll over, especially in curves and during sudden steering maneuvers, as a result of the exaggerated motion of the trailer.
- b. **Vehicle condition and preparation.** It is critical the vehicle is in good operating condition before starting a mission. Pay particular attention to the condition of the tires and tire air pressure. Properly performed preventive maintenance checks and services (PMCS) is the best way to control this potential hazard.

SLIDE 6:

c. **Driver risk management control measures.** Every driver can take eight basic steps to prevent or reduce the potential for rollovers.

(**Note**: Commanders should include safety tips in initial and sustainment tactical wheeled vehicle operator training).

- (1) Adjust the vehicle speed to allow a "speed cushion" for maneuvering (when approaching a curve reduce your speed by at least 10 miles per hour below the posted speed limit).
- (2) Slow down.
- (3) Avoid panic don't jerk the steering wheel. Many rollovers occur when the driver panics and/or jerks the steering wheel during an emergency. At highway speed, jerking the steering wheel can cause loss of control and the vehicle may slide sideways and roll over.
- (4) Observe speed limit and check speedometer to ensure vehicle is below the posted speed.
- (5) Do not rely on a "seat of the pants" sense to judge speed and vehicle maneuverability. New suspensions and chassis set-ups give a false sense of control.

- (6) Slowly accelerate out of the curve.
- (7) Maintain a "space cushion" (distance between the vehicle and other traffic) so the driver has a safe maneuvering speed to compensate for errors in judgment, weather, road conditions, and poor driving by other motorists.
- (8) Avoid the temptation to brake hard if the rear of the vehicle or trailer "slides out." Instead, if there is clearance, attempt to apply steady throttle, allowing the vehicle to straighten itself. Braking will accelerate the skid, contributing to loss of control and rollover.

Risk management procedures. All personnel are required to use vehicle restraint systems. It is recommended when operating tactical military vehicles during field training, driver's training, and tactical operations that the Kevlar/Advanced Combat Helmet (ACH) be worn at all times with chin strap properly secured.

SLIDE 7:

d. Teamwork is another key to successful rollover prevention:

- · Work as a team.
- Maintain crew integrity.
- Communicate with the driver. Tell the driver what is to the left, right, rear, and overhead. Your gunner is your eyes and ears! The gunner may be the only crew member capable of seeing around the entire vehicle. Use the vehicle intercom system to pass visual information to the driver, but rehearse shouted voice commands and hand signals in case the intercom fails. Avoid hazards by using a ground guide whenever possible.
- Identify terrain or conditions favorable for a rollover.
- Use a guide near bodies of water.
- Position team members within the vehicle.
- Combat locks help keep the doors closed in a crash, but are a hazard near water! Unlock combat door locks when near water (enemy situation permitting).
- Know how to get out. Rehearse vehicle evacuation as if only one exit is available.
 - Combat door locks on the M1114 Up armored HMMWV are designed to keep the enemy out. When locked they also make it extremely difficult for rescuers to enter the vehicle!
 - Accident damage may also jam the door locking devices, making them impossible to open.
 - If the doors cannot be opened by occupants or rescue team members and the vehicle is inverted in water too deep to allow air in the vehicle, the likelihood of drowning is high.
 - In this case, rescuers must immediately attempt to roll the vehicle on its side using all available means (tow straps, rope, winch cables, etc.) to gain access to the turret.
 - Leaders must decide, based on the enemy situation, whether or not to keep the doors locked when operating near any body of water (bridges over/roads adjacent to any canal, river, lake, pond, etc.).
- Learning Step / Activity 2. Identify actions to take when rollover is imminent
 Method of Instruction: Conference / Discussion

Instructor to Student Ratio: 2:15
Time of Instruction: 20 mins

Media: Large Group Instruction

SLIDE 8:

HMMWVs are fitted with armor as a means of reducing casualties from improvised explosive devices (IEDs) and small arms fire. Currently trucks in Iraq are not even allowed on the main and alternate supply routes unless they have Level I factory-produced armor (armor integrated into nearly every aspect of construction) or Level II add-on armor (ballistic steel plates and bulletproof windows). In addition, welding shops are adding "T-cups," additional armor surrounding the ring mount to protect the gunners. The additional protection the armor provides U.S. Soldiers from IEDs and small arms fire has its price. Uparmored HMMWVs are extremely-top heavy and vehicle rollovers have become a common and deadly occurrence.

Knowing what actions to take immediately prior to a potential rollover and immediately following a rollover are vital to the survival of the vehicle's crew.

Safety Note: Never attempt to leap from a rolling vehicle. Except for the gunner, ensure all vehicle occupants have their seat belts fastened. Ensure the gunner remains at the name tag defilade position with gunner's restraint system on when in the gunner's turret. Upon complete evacuation of all personnel, vehicle should be inspected for fire hazards such as leaking oil, fuel, ammunition and hydraulic fluid. Use the portable fire extinguisher when inspecting vehicle for leaks in case of fire, which could cause injury or death. If hazardous/explosive materials are involved, driver should take actions according to the DD Form 836 accompanying load. Notify rescue personnel and remain at evacuation distance while securing accident site.

SLIDE 9:

These steps should begin when the driver feels he has lost control of the vehicle and anticipates a rollover, but not into water.

- a. Driver:
 - (1) Releases the accelerator.
 - (2) Shouts, "Rollover, Rollover, Rollover!"
 - (3) Keeps hands on the steering wheel with arms extended but not locked.
 - (4) Plants feet firmly on the floor.
 - (5) Tucks head and chin into chest and braces for impact.
- b. Vehicle commander (VC):
 - (1) Shouts, "Rollover, Rollover, Rollover!"
 - (2) Uses left hand to pull gunner into the vehicle.
 - (3) Uses left hand and arm to hold the gunner in place.
 - (4) Plants feet firmly on the floor while holding onto a stationary object.
 - (5) Tucks head and chin into chest and braces for an impact.

SLIDE 10:

- c. Gunner:
 - (1) Shouts, "Rollover, Rollover, Rollover!"
 - (2) Pushes/pulls self down into the vehicle.
 - (3) Holds onto a stationary object.
 - (4) Tucks head and chin into chest and braces for impact.

- (5) **Does not place hands or fingers on turret.** Turret's movement can cause additional injuries.
- d. Other crewmembers (if present):
 - (1) Shout, 'Rollover, Rollover, Rollover!"
 - (2) Assist VC in pulling the gunner into the vehicle and hold him.
 - (3) Tuck heads and chins into chests and brace for impact.
 - (4) Hold onto a stationary object.

SLIDE 11:

When in the vicinity of water and tactical conditions permit:

- a. VC:
 - (1) Informs vehicle crew that the vehicle is operating around water hazards.
 - (2) Reminds the crew of the risk mitigating measures.
 - (3) Unlocks the combat door locks.
 - (4) Ensures all loose gear and cargo are secured.

When water entry is imminent, whether or not the potential for a rollover exists, these steps should be followed:

- b. Driver:
 - (1) Releases the accelerator and controls the entry by steering into the body of water.
 - (2) Yells "Water!"
 - (3) Keeps hands on the steering wheel with arms extended but not locked.
 - (4) Plants feet firmly on the floor.
 - (5) Tucks head and chin into chest and braces for impact.

SLIDE 12:

- c. VC:
 - (1) Shouts, "Water!"
 - (2) Uses left hand to pull gunner into the vehicle.
 - (3) Uses left hand and arm to hold the gunner in place.
 - (4) Plants feet firmly on the floor while holding onto a stationary object.
 - (5) Tucks head and chin into chest and braces for an impact.
- d. Gunner:
 - (1) Yells, "Water!"
 - (2) Pushes/pulls self down into the vehicle.
 - (3) Slides feet in the direction of the vehicle's movement.
 - (4) Plants feet firmly on the floor while holding onto a stationary object.
 - (5) Tucks head and chin into chest and braces for impact.
 - (6) **Does not place hands or fingers on turret.** Turret's movement can cause additional injuries.
- e. Other crewmembers (if present):
 - (1) Shout, "Water!"
 - (2) Assist VC to pull gunner into the vehicle and hold him.
 - (3) Tuck head and chin into chest and brace for impact.
 - (4) Plant feet firmly on floor while holding onto a stationary object.

NOTE: Conduct a check on learning and summarize the learning activity.

CHECK ON LEARNING: Conduct a check on learning and summarize the ELO.

B. ENABLING LEARNING OBJECTIVE

ACTION:	Understand measures to take after rollover
CONDITIONS:	In a classroom, provided instruction on preventive and reactive measures, crewman duties and emergency steps to take in case of a vehicle rollover
STANDARDS:	Identify precautionary and reactive measures to take in case of a HMMWV vehicle rollover by answering the check-on-learning questions posed by instructor with a minimum of 80%.

1. Learning Step / Activity 1. Identify actions to take after a Vehicle Rollover (not in water)

Method of Instruction: Conference / Discussion

Instructor to Student Ratio: 2:15
Time of Instruction: 10 mins

Media: Large Group Instruction

SHOW SLIDE 13:

SLIDE 14:

1. After rollover (not in water)

- a. Each crewmember, whether driver, VC, or rear crew:
 - (1) Braces one hand on the ceiling.
 - (2) Unbuckles seatbelt with other hand and immediately puts both hands on ceiling.
 - (3) Slides out of seat and sits up.
 - (4) Disconnects headset.
 - (5) Turns off motor (driver).
 - (6) Orients self on the nearest door.
 - (7) Unlocks combat door locks.
 - (8) Opens door; if it does not open, try a different door.
 - (9) Exits with weapon.
 - (10) Assists remaining crew to exit.
 - (11) Establishes security.
 - (12) Checks for fires.
 - (13) Activates fire extinguisher, as needed.
 - (14) Recovers sensitive items.
 - (15) Provides first aid.
 - (16) Assists in vehicle recovery.

SLIDE 15:

- b. Gunner:
 - (1) Disconnects headset.
 - (2) Releases Gunners Restraint System/Product Improved Gunner's Restraint System
 - (3) Orients self on the nearest door.
 - (4) Unlocks combat door locks.
 - (5) Opens door; if it does not open, tries a different door.
 - (6) Exits with weapon.

- (7) Assists crew to exit.
- (8) Establishes security.
- (9) Checks for fires.
- (10) Activates fire extinguisher, as needed.
- (11) Recovers sensitive items.
- (12) Provides first aid.
- (13) Assists in vehicle recovery.

SLIDE 16:

2. If vehicle rolls onto side

- a. Lower level Soldiers, if able:
 - (1) Unbuckle seat belts.
 - (2) Assist upper Soldiers to unfasten seat belts then carefully lower.
- b. Crew, if doors are jammed:
 - (1) Exit through hatch or cargo area if possible.
 - (2) Work as a team to open jammed doors.

NOTE: Conduct a check on learning and summarize the learning activity.

2. Learning Step / Activity 2. Identify actions to take after a Vehicle Rollover (in water)

Method of Instruction: Conference / Discussion

Instructor to Student Ratio: 2:15
Time of Instruction: 10 mins

Media: Large Group Instruction

SLIDE 17:

- 1. After rollover (in water)
 - a. All crewmembers:
 - (1) Turn off motor (driver).
 - (2) Disconnect headsets.
 - (3) Unbuckle seatbelt with one hand and immediately put both hands on ceiling.
 - (4) Unlock combat door locks if not already unlocked.
 - (5) Decide whether or not to remove personal equipment.
 - (6) Exit the vehicle.
 - (7) Assist each other to exit and secure weapons.
 - (8) Assess injuries.
 - (9) Get to safest shore.
 - (10) Provide security.
 - (11) Account for other crewmembers.
 - (12) Provide/seek first aid.
 - (13) Retrieve weapons, ammunition, and sensitive items.
 - (14) Assist with vehicle recovery.
 - b. VC:
 - (1) Accounts for weapons, ammunition, and sensitive items
 - (2) Requests medical support, if required.

(3) Reports accident.

SLIDE 18:

2. Water rescue recovery drill

In the event one or more crewmembers do not personally egress from the overturned vehicle:

- a. Rescuers secure the accident site.
- b. Stay in contact with the vehicle, hold onto the vehicle, and kick/swim to a high point in buddy teams.
- c. Rescuers tie a rope/cable to the vehicle to aid rescue.
- d. Open doors and hatches, using the emergency rescue wrench if necessary.
- e. If doors and hatches are not accessible, rescuers must immediately use all available means to turn vehicle on its side to gain access to the turret.
- f. Seek out the highest point on the vehicle from which to rescue trapped occupants.
- g. Ensure all survivors have air and are able to breathe.
- h. Check for other injuries and apply first aid.
- i. Remove personal equipment, including body armor.
- j. Carefully move injured personnel to the highest point on the vehicle.
- k. Evacuate from vehicle high point to safest location, depending on:
 - (1) Enemy situation
 - (2) Water level and flow
 - (3) Water temperature
 - (4) Distance to water's edge
 - (5) Anticipation of rescue

NOTE: Conduct a check on learning and summarize the learning activity.

CHECK ON LEARNING: Conduct a check on learning and summarize the ELO. **SHOW SLIDE 19: CHECK ON LEARNING**

1. A combat patrol loaded M1114, with a normal center of gravity (cg) and normal load can operate on slopes of up to:

- a. 20 degrees.
- b. 25 degrees.
- c. 30 degrees.
- d. 98.6 degrees.

2. The critical (rollover) angle for an in theatre up-armored HMMWV is:

- a. 20 degrees.
- b. 25 degrees.
- c. 30 degrees.
- d. 98.6 degrees.

3. The corrective action before reaching the critical rollover angle is:

- a. Jerk the wheel back to the center of the road.
- b. All occupants yell, "Water!"
- c. Reduce speed and ease the vehicle back onto the roadway at a safe speed.
- d. Secure the coolers and secure voice radios.

4. During egress, you find the door you're attempting to exit won't open. You should:

- a. Inflate your water wings, kick out the windshield, and swim away from the enemy.
- b. Don't panic find a door that works.
- c. Stay put and call the Auto club.
- d. Stay put and call QRF on the secure voice radio.

SHOW SLIDE 20:

5. What are the egress actions for the Gunner following a rollover on dry land?

- a. Disconnect headset, release gunner's restraint system, assess injuries, clear and check weapon, exit vehicle with weapon.
- b. Assist crew to exit, establish security, recover sensitive items, provide first aid and assist in vehicle recovery.
- c. a and b above.
- d. Leap from the vehicle before it rolls.

6. What are the immediate actions of the Driver should an entry into the water be imminent?

- a. Release the accelerator; yell "Water!" and keep hands on the steering wheel.
- b. Tuck head and chin into chest and brace for impact; and steer vehicle to control entry into the water to prevent rollover.
- c. a and b above.
- d. Leap from the vehicle before it hits the water.

7. Prior to releasing your seatbelt for egress, and immediately afterward, you must:

- a. Brace with one hand against what was the ceiling (consider which hand you should brace with) your neck cannot support your body weight during a fall; unfasten your seatbelt with the other hand.
- b. Unfasten your seatbelt with one hand, pushing firmly until it pops loose. You may have to push against the floor with your bracing hand to allow the seatbelt to unfasten.
- c. a and b above.
- d. Take out your k-bar and cut the thing off.

SHOW SLIDE 21:

8. What is the purpose of the combat door lock?

- a. To prevent aggressors from entering the vehicle in a hostile area.
- b. It interfaces with the Lojack circuitry, and assists police in recovery of a stolen HMMWV.
- c. It iettisons the door if moisture is detected during a water entry.
- d. There is no difference between a combat door lock and a conventional door lock.

9. When operating near bodies of water or crossing bridges, the HMMWV crew should:

- a. Inform crewmembers of the water hazard, loosen seatbelts, and slow down.
- b. Identify water hazards, unlock combat locks, remove seatbelts, and slow down.
- c. Slow down, inform crewmembers of possible water hazards, unlock combat door locks (enemy situation permitting).
- d. Look for alternate routes.

10. To reduce the risk of being involved in a rollover, HMMWV crews should:

- a. Check tires for proper inflation and serviceability, and slow down.
- b. Slow down, don't overload the vehicle, check condition and serviceability of tires, and secure loads.
- c. Ensure operators are properly licensed.
- d. Limit crews operating in the vehicle to four or less.

SHOW SLIDE 22:

11. What can gunners do to minimize their injuries when involved in a rollover?

- a. Try to jump away from the vehicle.
- b. Lower themselves and brace for impact.
- c. Yell "Rollover!" while lowering themselves into the vehicle, bracing for impact.
- d. Call the Automobile Club and complain about that last sharp curve in the road.

12. What preventive measures can be taken to minimize the chances of being involved in a rollover?

- a. Make a detailed Power Point presentation of any sharp curve in the road for emailing to your Congressman in a formal yet anonymous complaint.
- b. License and certify all crews on the HEAT, and train as a team.
- c. Slow down, avoid panic, know proper vehicle maneuvering, use caution in rural areas with soft shoulders, and identify water hazards.
- d. Only tracking your number of days left in country will help.

13. Other than the driver and gunner, what are the duties of the crew in the event of a rollover?

- a. Yell "Rollover!"
- b. Grab the gunner and pull him/her into the crew compartment.
- c. Brace for impact.
- d. All of the above.

SLIDE:23

C. ENABLING LEARNING OBJECTIVE

ACTION:	HEAT operator performance drill familiarization
CONDITIONS:	In the HEAT trainer with required equipment and previous training.
STANDARDS:	Properly evacuate the HEAT while adhering to applicable safety precautions and procedures outlined in this lesson and applicable references.

1. Learning Step / Activity 1. Review rollover and escape actions/observe HEAT

Method of Instruction: Conference/Demonstration

Instructor to Student Ratio: 2:5

Time of Instruction: 25 mins

Media: Small Group Instruction (SGI)

SLIDE 24:

Show HEAT Gunner restraint system Video and demonstrate/review restraint system (CLICK BOX TO BEGIN MOVIE)

Observation.

- 1. Move group to the HEAT device room, and observe the previous group undergoing training in the device. After the group in the HEAT completes their cycle, move the observation group into the device to perform PE.
- 2. Group is in device with restraints fastened and doors locked. Conduct review/walk thru of below Drill/actions to take during and immediately following rollover and escaping from the HMMWV.
- 3. Communicate with the driver tell the driver what is to the left, right, rear and overhead. Your gunner is your eyes and ears. The gunner may be the only crewmember capable of seeing around the entire vehicle. Use the vehicle intercom system to pass visual information to the driver, but rehearse shouted voice commands and hand signals in case the intercom is inoperative. Avoid hazards; use a ground guide whenever practicable. The gunner must remain in *nametag defilade* IAW FM 21-305 (Manual for the Wheeled Vehicle Driver), TC 21-305 (Training Program for Wheeled Vehicle Accident Avoidance), TC 21-305-4 (Training Program for the High Mobility Multipurpose Wheeled Vehicle), and TC 21-306 (Tracked Combat Vehicle Driver Training).

Note: Of all the vehicle occupants, the likelihood of injury to the gunner is disproportionately higher than those of the others. Knowing the fundamental purpose of the HEAT, those occupying the gunner position must exercise particular diligence in securing occupant restraints, bracing for the rollover, and be particularly mindful of the increased potential for head and neck injuries – even in the device. Further, those occupying the gunner position in the HEAT must verify prior to each rollover iteration that the gunner hatch locking mechanism remains secure, and to avoid inadvertent disengagement of the lock during each rollover.

4. Wear seatbelts. Survive the rollover!

5. During the roll:

- (a) **The driver drives**. Continue to navigate the vehicle as long as the controls of the vehicle influence and direct its path and speed.
- (b) The gunner must slip out of the gunner's seat, attempting to retract into the cab of the vehicle as quickly as possible sliding their feet towards the direction of the roll. While this action doesn't eliminate the bouncing around inside the vehicle, it substantially reduces the likelihood of decapitation, and puts the roll cage of the vehicle between the gunner and the accident site.
- (c) All others in the vehicle must make a grab for the gunner, assisting him/her as abruptly as necessary to get into the cab of the vehicle as quickly as possible.
- 6. Use combat locks safely. Combat locks help keep the doors closed in a crash, but are often a hazard near water. Unlock combat door locks when near water (enemy situation permitting).
- 7. Know how to get out. Rehearse vehicle evacuation as if only one exit is available. **Actual egress entails**:
 - (a) **BRACE** with one hand against the floor (what was the ceiling).
 - (i) Consider which hand you should brace with (figure which hand can reach your seatbelt, and use the other one to brace).

- (ii) Do not unlatch your seatbelt without bracing on the floor your neck cannot support your body weight, let alone all the *battle rattle* you have on.
- (b) **UNFASTEN** your seatbelt with your other hand.
 - (i) Push against the floor with your bracing hand to release the tension on the seatbelt so it will unfasten.
 - (ii) Find the release button and press it firmly until it pops loose.
 - (iii) Be prepared to fall when the belt unlatches. Tuck your head, and protect your neck at all costs.
- (c) **SLIDE** out of your seat, being sure to **disconnect your headset**.
 - (i) Remember that you cannot open the door while inverted.
 - (ii) Be aware of your buddies and don't kick them in the face.
 - (iii) Muzzle awareness at all times.
 - (iv) Be aware your gear may get caught on something.
- (d) **ORIENT** yourself on the door.
 - (i) Dropping out of your seat is more disorienting than expected.
 - (ii) Get yourself right side up before worrying about the door.
 - (iii) Look at the door consider how it will open now that it is inverted.
- (e) **UNLOCK AND OPEN** the door. If it doesn't open, find a door that works. Recall whether your vehicle is one with two-stage combat locks or one-stage, and the differences it takes to open each.
 - (i) Armored doors weigh in excess of 240 pounds each, and are not meant to be inverted.
 - (ii) The door may be difficult or impossible to open.
 - (iii) Once the latch is open, you will have to really lean into the door to get it open. However, if your door is not opening, try another door!
 - (iv) When you open a door, shout "Open door (and the location)!"
- (f) **GET OUT**, but don't let your buddy down.
 - (i) Determine if all crewmembers are aware of the open door, and whether they are moving toward it.
 - (ii) Determine if all crewmembers are conscious.
 - (iii) Consider the risks of moving injured soldiers don't make the situation worse, but you can't leave them hanging upside down, or there to drown.
 - (iv) Look before you leap don't rush out the first door, only to fall off a cliff, or thrust yourself into a burning fuel or oil slick.
- 8. The **Gunner's egress** entails some specific and additional steps:
 - (a) Slide feet to the direction of roll, as the torso and legs are withdrawn to present the lowest possible profile.
 - (b) Depending on how the rear seats are occupied:
 - (i) When both rear seats are occupied, both rear seat occupants will maintain a firm grasp on the gunner, pulling the gunner down inside the vehicle through the turret assisting in restraining the gunner throughout the rollover until the vehicle has come to a stop.
 - (ii) If only one rear seat is occupied, the back seat occupant will pull the Gunner toward them, much as described above.
 - (c) Releases Gunners Restraint System/Product Improved Gunner's Restraint System and egress.

NOTE: Conduct a check on learning and summarize the learning activity.

SLIDE 25

D. ENABLING LEARNING OBJECTIVE

ACTION:	Familiarization of HEAT components and emplacing the HEAT into initial operation
CONDITIONS:	Given a HEAT with all applicable COEI and BII and a suitable location to place the HEAT into operation.
STANDARDS:	Properly locate a site to set up the HEAT, identify equipment needed to place the HEAT into operation, perform initial set-up, conduct function test, perform PMCS and general maintenance on the HEAT, Perform Start, Stop, Rotation, and Lock Operations, understand the risk and safety precautions associated with the HEAT.

1. Learning Step / Activity 1. Familiarization of HEAT components and their functions

Method of Instruction: Conference/Demonstration on HEAT

Instructor to Student Ratio: 2:15
Time of Instruction: 25 mins

Media: Small Group Instruction (SGI)

1. The HEAT has several major components that individuals need to be familiar with in order to conduct set-up and training on the device. Knowing the components and their functions will allow for trainers to effectively conduct training that is both safe and beneficial to the unit. First, we will give a general description of the HEAT and its characteristics.

SLIDE 26

The HEAT is a training simulator capable of:

- Egress training that has unlimited rotation of 360° in either direction. (**Note:** at 90 deg, egress is thru gunners hatch only.)
- Egress training that can be conducted at 90 deg. (vehicle rolled onto either side) or at 180 deg. (vehicle rolled onto its roof) (Note: At 90 deg, egress is thru gunners hatch only.)
- Cab can be stopped at any position
- Electrical Drive System
- NPC Robotics 24-volt DC electric motor (3600 rpm; 2 hp; NEMA 56C mount) with integrated electric brake
- Textron Power Transmission Model (GEARBOX): HO60, Single Reduction Double-Enveloping Worm Gear Reducer (40:1) with integrated Double Reduction Helical Gear Reducer (26.4:1) (1056:1 Overall Ratio)
- Falk Type G82 Rigid Coupling

- Dodge SOLIDLUBE 700 Series Sleeve Bearing (Sealed Bearing)
- Multiple Power Supply Options
- 24-volt batteries (on board HEAT)
- NATO slave cable
- 110-volt AC (from outside source rectifier on board HEAT)
- 2 Personnel Required for Setup and Operation
 - 1 operator for master controls
 - o 1 safety observer with emergency stop control

- C130 Transportable
 - o Height less than 102 in. (HEAT in Stowed position: 99 in.)
 - o Width less than 107 in. (HEAT in Stowed position: 106 in.)
 - o Length less than 480 in. (HEAT in Stowed position: 177 in.)
 - o Current HEAT weight is 13,200 Lbs.

HEAT Weight and Space Requirements

HEAT in Stowed Position

•	Height	97 inches
•	Width	106 inches
•	Length	177inches
•	Weight	13,200Lbs.

HEAT Fully Operational

•	Height	121 inches
•	Width	182 inches
•	Length	177inches
•	Weight	13,200Lbs.

2. Students first need to be familiar with the general structure of the heat and each major items name and function.

SLIDE 28

HEAT Structural Components

- 1. LIFTING POINTS— There are four lifting point for the HEAT assembly, two in the front and two in the rear, the left rear is equipped with a slide out position to avoid damaging the gearbox motor assembly.
- 2. OUTSIDE SPEAKER—Speaker used for verbal communication between operator and HEAT crewmembers.
- 3. MIC—Mic used for verbal communication between operator and HEAT crewmembers.

- 4. TIE DOWN—Used during shipping to secure HEAT assembly to transport equipment during shipping.
- 5. OPEATORS CONTROL PANEL— From this location the front operator operates the controls for the HEAT assembly.
- 6. CREW DISPLAY PANEL— From this location the front operator views the crew inside the HEAT assembly and operates the operator's display panel during operation.

- 7. GEARBOX—David Brown Textron Power Transmission Ratio 28:1, Model No: M032228.BANU1, Order number 06467656-100-1, Lubrication 632.
- 8. M1114 CAB—Truck, Utility: Up-Armored Carrier, 4X4, M1114 crew cab.
- 9. NATO ADAPTER—The electric power supply receptacle used to supply 24 volts to HEAT electrical system for charging batteries or for emergency back-up power.
- 10. POWER INVERTER—The inverter/charger uses advanced high-frequency switching technology in the power conversion process. The circuits are similar to those used in power supplies for computers and other modern electronic equipment. This technology offers several benefits:
 - Light weight: for easy installation
 - Quiet operation: no transformer buzz
 - Clean DC output: filtered output for ideal battery charging
 - · High surge capability: for hard-to-start AC loads
- 11. TIE DOWN—Used during shipping to secure HEAT assembly to transport equipment during shipping.
- 12. BATTERY BOX—Consist of Four batteries and a NATO slave receptacle that provides electrical power for charging when batteries are not charged.
- 13. REAR JUNCTION BOX—Used to house electrical wiring and connection point for rear E-stop. From
- 14. REAR E-STOP—Connected to a tether power cable that is connected to rear junction box. Used to stop HEAT rotation in an emergency condition.
- 3. Students need to be familiar with the Operators Control Panel, Crew Display Panel, and the Cab Equipment. The Operators Control Panel is the main operational hub of the HEAT. The person operating this panel needs to be familiar with the total operation of the HEAT and is overall responsible for the safe conduct of training. The person operating the control panel should not have any other duties while in control of the HEAT. Address each part in the control panel give the function of each part.

Operator Control Panel

- MASTER POWER SWITCH/KEY— This is a two-position key operated master power switch. Used or turning master power on and off. The off position is key turned all the way to the left and the on position is key turned all the way to the right
- 2. MASTER POWER LIGHT— This light will illuminate red when master power switch/key is turned the on position.
- 3. HOUR METER— The meter displays hour of HEAT operation. The hour meter starts adding whenever the master power switch/key is turned the on position.
- 4. BATTERY LEVEL INDICATOR— This displays current battery level charge once master power switch/key is turned the on position.
- 5. OPERATOR CONTROL PANEL— Contains instrument gauges, switches, and indicator lights used during HEAT operation.
- 6. E-STOP— This is a two position pushbutton operated button. Pushed in, this is used in any emergency situation to stop the rotation of the HEAT cab assembly, also used during procedure as a safety precaution. Pulled out allows HEAT to resume operations.
- 7. SIDE-TO-SIDE JOYSTICK— The joystick is spring loaded to return to center position when released. Moving the joy stick left rotates HEAT cab assembly counter clockwise (CCW). Moving the joy stick right rotates HEAT cab assembly clockwise (CW).
- 8. COMBAT LOCKS OVERIDE— The switch has a red safety cover that must be flipped up before use..
- 9. MIC SWITCH— This switch is spring-loaded and is used in the up position toe communicate with the crewmembers inside the M1114 cab assembly.
- 10. MOTOR SWITCH— This is a two position on / off switch. When turned to the right, on position the switch activates a relay to energize the motor and side-to-side joystick.
- 11. **DATA PLATE:** Includes the following information: Name of device, manufacturer, device number, serial number, contract number, year of manufactured, length, width, height, and shipping weight.

SLIDE 31

Operator's Control Panel (Contd)

- 12. MIC— This relays audio commands from the operator to the crewmembers when the mic switch on the operator's control panel is placed and held in the up position.
- 13. SPEAKER— Constantly playing audio of all crewmembers sound.MIC— This relays audio command from the operator to the crewmembers when the mic switch on the operator's control panel is placed and held in the up position.

14. REAR E-STOP— This is a two position pushbutton operated button. Pushed in, this is used in any emergency situation to stop the rotation of the HEAT cab assembly, also used during procedure as a safety precaution. Pulled out allows HEAT to resume operations.

SLIDE 33

Crew Display Panel

- CREW DISPLAY PANEL—Displays the status of the following HEAT functions E-stops, combat locks overrides, degrees rotated, all four doors safety switches, combat lock override and live camera display of cab crewmembers.
- 2. POWER CONTROLS—When power is first connected to the unit, the unit defaults to the Off state. The Power On-Off button is marked with the I/O symbol. Momentarily pushing this button will turn the LCD on or off. Just below the I/O symbol is a Power On indicator, a red LED. Once the unit is connected to a power source, pressing the power button once will turn the unit on and the LED will indicate that the unit is ready. Pressing the power button again will turn the unit off.

NOTE

Setting Brightness, as a rule, adjust the brightness of the display to the lowest possible setting for a given set of conditions and display characteristics. Doing so will provide for the best viewing of the image, will extend lamp life of the backlight, reduce the power required by the LCD, and reduce the power consumption and internal heat of the display.

- 3. BRIGHTNESS CONTROLS—Located next to the Power on LED are two buttons for controlling the brightness of the display. The button with the large sun symbol, if either button repeatedly pressed or when held for several seconds, will cause the brightness to decrease. The very brightest setting is for operation when the ambient light is at a maximum. This can be stepped down in increments to the lowest setting, which is just above total black and is suitable for use in very subdued light or night operations. The unit will automatically revert to a midrange setting when power is turned off.
- 4. SELECT BUTTON—Select the currently highlighted menu item as the parameter to be modified or when in a menu that contains no highlighted item, return to parent menu.
- 5. RIGHT BUTTON—When in scrolling mode, move the highlight down through the menu items. When in parameter-adjustment mode, decrease the value of the parameter.
- 6. LEFT BUTTON—When on scrolling mode, move the highlight up through the menu items. When in parameter-adjustment mode, increase the value of the parameter.

Cab Equipment

- 1. CREWMEMBER E-STOP— Located in the cab assembly for crewmember emergencies. This is a two position pushbutton operated button. Pushed in, this is used in any emergency situation to stop the rotation of the HEAT cab assembly, also used during procedure as a safety precaution. Pulled out allows HEAT to resume operations.
- 2. CREW SPEAKER— Constantly sends audio of all crewmembers sound to front operator speaker.
- 3. CREW MIC— This relays audio command from the crewmembers to operator at all times.

SLIDE 35

NOTE

Both cameras are identical only right side is shown below.

- 4. CAMERA'S— Two inner cab front mounted cameras relay a constant video signal to the front operator's crew display panel.
- 2. Learning Step / Activity 2. Site selection and set-up of the HEAT

Method of Instruction: Conference/Demonstration on HEAT

Instructor to Student Ratio: 2:15
Time of Instruction: 20 mins

Media:Small Group Instruction (SGI)

SLIDE 36

- 1. The selected site for the placement of the HEAT should have adequate room for safe operation of the equipment and allow enough room for the individuals conducting the training. The following set-up procedures are based on the HEAT assembly arriving in the stowed position. Once the HEAT arrives, the following steps should be conducted:
 - a. There should be a minimum of two (2) personnel to conduct set-up and operation of the equipment.
 - b. Individuals should visually check the heat for damaged or missing hardware.
 - c. Check for all BII inventory.
 - d. Do not attempt to start procedures if any power cords are connected to the HEAT. Failure to comply may result in injury or death to personnel and damage to equipment.

SLIDE 37

3. Side Platforms Setup

- a. Remove two inner platform-locking pins (1) from each side of platforms (2).
- b. Remove pins (3) from support legs (front and rear) (4).

- c. Lower support leg (front and rear) (4) so upper hole on leg aligns with hole
- on side platform (3).
- d. Install pin though side platform (3) and support leg (4).

SLIDE 39

- e. Using both personnel grasp each end of platform hand rail (1) and pull outward until fully extended to stop bracket (2). Return inner locking pins to locked position.
 - f. Grasp steps (3) and rotate to ground.

NOTE: All steps are hinged to side platform

SLIDE 40

- 4. Install Gunner's Cage
 - a. Remove eight cotter pins (1) from upper cab support weldment (3).

NOTE

Side support panels must be raised first, before front and rear support panels.

- b. Raise two side support panels (2).
- c. Install four pins (8) and cotter pins (7) on side support panels (2).
- d. Raise front and rear support panels (4).
- e. Install four cotter pins (1) on front and rear lower support panels (4).
- f. Attach 10,000 pound lifting device to four lifting points (5) on upper gunner's cage (6).
- g. Lower upper gunner's cage (6) onto lower support panels (2) and (4).
- h. Replace four cotter pins (1) through gunner's cage mounting hole (9).

SLIDE 41

5. Connect Power Cable using 110v Wall Outlet

WARNING

All control switches must be in the off position before connecting power cord to wall outlet. Failure to place control switches in the off position may result in injury or death to personnel.

- a. Check that master power switch/key (1) is removed from operator's control panel.
- b. Check that E-stop (2) is pushed in.
- c. Raise power inverter cover (3) and connect yellow power inverter cord (4) to inverter.

WARNING

Ensure that the power outlet being used for the HEAT is powered by a minimum of a 15 amp circuit breaker.

Failure to comply may result in injury or death to personnel or damage to equipment.

- d. Connect power extension cord (4) to 15 amp 110v wall outlet.
- e. Ensure power switch (5) to the inverter and battery charger is in the on position.
- 3. Learning Step / Activity 3. Conduct PMCS on the HEAT

Method of Instruction: Conference/Demonstration

Instructor to Student Ratio: 2:15
Time of Instruction: 20 mins

Media:Small Group Instruction (SGI)

HANDOUT 4

SLIDE 42

- Designated Intervals.
 - a. BEFORE checks and services of PREVENTIVE MAINTENANCE must be performed prior to placing vehicle or its components in operation.
 - b. DURING checks and services of PREVENTIVE MAINTENANCE must be performed while the vehicle and/or its components/systems are in operation.
 - c. AFTER checks and services of PREVENTIVE MAINTENANCE are performed upon completion of mission.
 - d. WEEKLY checks and services of PREVENTIVE MAINTENANCE are performed once every 7 days.
 - e. MONTHLY checks and services of PREVENTIVE MAINTENANCE are performed once every 30 days.

2. Procedures.

- a. For troubleshooting malfunctions, refer to Handout 5
- b. Use DA Form 2404 or DA Form 5988-E (automated) and report malfunctions to Field Maintenance at once.
- Tools included with vehicle are to be used when making PREVENTIVE MAINTENANCE checks and services. Wiping cloths are needed to remove dirt or grease.
- d. Refer to appropriate TMs for PMCS requirements on mounted systems (i.e., missiles systems, radios, etc.).

SLIDE 43

- 3 Trouble spots.
 - a. Check all bolts, nuts, and screws. If loose, bent, broken, or missing, either tighten or report conditions to field maintenance.
 - b. Look for loose or chipped paint, and rust or cracks at welds. Remove rust and loose paint, and spot-paint as required. If a cracked weld is found, report situation to field maintenance.
 - Inspect electrical wires and connectors for cracked or broken insulation. Also look for bare wires and loose or broken connections. Tighten loose connections. Report

- other problems to Field Maintenance.
- d. Check hinges for security and operation.
- e. Check data, caution, and warning plates for security and legibility.
- f. Not Ready/Available. If a vehicle is not able to perform the mission, equipment will be reported as not ready/available. Refer to DA Pam 738-750.
- g. Correct Assembly or Stowage. Check each component for installation as an assembly, that it is in the right place, and has no missing parts.

4. Fluid Leakage

- a. Wetness around seals, gaskets, fittings, or connections indicates leakage. A stain also denotes leakage. If a fitting or connector is loose, tighten it. If broken or defective, report it. Use the following as a guide:
 - 1. Class I. Leakage indicated by wetness or discoloration, but not great enough to form drops.
 - 2. Class II. Leakage great enough to form drops, but not enough to cause drops to drip from item being checked/inspected.
- 3. Class III. Leakage great enough to form drops that fall from the item being checked/inspected.
- 4. Learning Step / Activity 4. Perform Single Handle Latch and Lock Operations

Method of Instruction: Conference/Demonstration on HEAT

Instructor to Student Ratio: 2:15

Time of Instruction: 20 mins

Media: Small Group Instruction (SGI)

SLIDE 44

1. This portion will be a slide presentation in the classroom followed by practical application on the HEAT

NOTE

All direction and orientation of rotation is from the operator's perspective.

2. To operate the single handle latch and lock from the outside proceed as follows:

CAUTION

Exercise caution when opening the exterior handle to avoid pinching fingers between handle and overlays.

 Pull up on exterior handle until the door latch releases. The door will spring. Pull handle to open.

SLIDE 45

- 3. To operate the single handle latch and lock from the inside proceed as follows:
 - Using arm nearest the door, place hand on the curved portion of the handle with the hand in the palm down direction. Pull straight back towards the rear of the vehicle.
 - While maintaining the pull back force, push down on the curved portion of the handle. The door latch should release. Push door open.

- 4. To engage the combat locks from the inside proceed as follows:
 - Using the arm nearest the door, place hand on the curved portion of the handle with the hand in the palm down direction. Pull straight back towards the rear of the vehicle.
 - While maintaining the pull back force, rotate the handle up towards the window until it clicks into position. The combat locks are now engaged.

SLIDE 47

- 5. To exit the vehicle, with combat locks engaged, in one motion proceed as follows:
 - Place hand on the curved portion of the handle and pull straight back towards the rear of the vehicle.
 - While maintaining the pull back force, in one swift motion, rotate the handle down and continue pushing down until the door latch releases. Push door open.

SLIDE 48

- 6. There is an additional lock on the top rear of each door of the HEAT. This door lock is used for training purposed by the operator to simulate a door that will not open after a rollover. It operates by lifting up to open and pulling down to lock.
- Learning Step / Activity 5. Perform Function Check, Start and Stop, 25°, 30°, 90°, 180° and 360° Rotations

Method of Instruction: Conference/Demonstration on HEAT Instructor to Student Ratio: 2:15

Time of Instruction: 20 mins

Media: Small Group Instruction (SGI)

SLIDE 49 (Handout 6)

This portion of training will be a slide familiarization followed by a practical application on the HEAT

Function Test is conducted prior to any simulation. Function Test is conducted without personnel in the crew compartment in the cab assembly. The purpose of the Function Test is to ensure the trainer is operational and safe to conduct training.

WARNING

Failure to comply may result in injury or death to personnel. During function test ensure that no crew members are in cab assembly.

CAUTION

Windows must be closed and training locks secured before a rotation.

NOTE

All direction and orientation of rotation is from the operator's location.

- 1. Perform safety checks
 - Check that Gunners cage slider door is in the closed position.
 - Check that Gunner's hatch on M1114 cab is in the open locked position
 - Check that all windows are up and in the locked position.
 - Check that no personnel or objects are within 6 ft of HEAT
 - Check that all personnel are removed from cab assembly.
 - Check with assistant operator that all is clear.
 - Check that motor switch is in the off position.
 - Turn on Crew Display control panel.
 - Check the functionability of all three E-stops. This will require both the operator and the assistant operator/instructor.
- 2. Using front operator's control panel (1) turn master control key switch (2) to the right until red power light (3) is illuminated.

WARNING

Injury to personnel may occur. If battery gauge is below four bars, do not start rotation.

- 3. Set motor power (9) to the On position.
- 4. Check battery level indicator (5) before starting any rotations. Battery level bars should show four or more before using HEAT or starting a rotation.
- 5. If battery level indicator (5) displays in the low red allow time for HEAT batteries to charge before starting any rotations

NOTE

HEAT will not rotate when motor power is in the off position. HEAT will not rotate when there are no personnel in cab assembly, unless the combat lock override is in the override position.

- 6. Set the combat lock override (8) in the override position.
- 7. Observe HEAT and the crew display panel, while moving the ROTATE (CW) (7) to the right until the cab assembly has made a complete 360° rotation.

NOTE

While observing the crew display panel, if the degree of incline indicator does not change see WP 0019 malfunction number 6.

- 8. Observe HEAT and the crew display panel, while moving the ROTATE (CCW) (7) to the left (7) 25° until the cab assembly is in 25° position. If everything operates properly, rotate the cab assembly back to 0° position.
- 9. Observe HEAT and the crew display panel, while moving the ROTATE (CW) (7) to the right 30° until the cab assembly is in a 330° position. If everything operates properly, rotate the cab assembly back to 0° position.
- 10. Observe HEAT and the crew display panel, while moving the ROTATE (CCW) (7) to the left 90° until the cab assembly is in 90° position. If everything operates properly, rotate the cab assembly back to 0° position.
- 11. Observe HEAT and the crew display panel, while moving the ROTATE (CW) (7) to the right until the cab assembly is in an 180° position. If everything operates properly, rotate the cab assembly back to 0° position.

6. Learning Step / Activity 6. Risks and Hazards associated with HEAT set-up, operation, and maintenance

Method of Instruction: Conference/Discussion

Instructor to Student Ratio: 2:15
Time of Instruction: 10 mins

Media: Small Group Instruction (SGI)

SLIDE 50, Handout 6

 Risk Management for this training is <u>Moderate</u> - CRM is a decision-making process used by leaders to mitigate risks associated with all hazards that can injure or kill people, damage or destroy equipment, or otherwise impact mission effectiveness. CRM must be accomplished using appropriate composite risk management worksheet in Handout 7 of this TSP prior to the conduct of this training.

SLIDE 51

- a. Ensure that the power outlet being used for the HEAT is powered by a minimum of a 15-amp circuit breaker. Failure to comply may result in injury or death to personnel or damage to equipment.
- b. All control switches must be in the off position before connecting power cord to wall outlet. Failure to place control switches in the off position may result in injury or death to personnel.
- c. Before starting procedures ensure SITE REQUIREMENTS AND LAYOUTS has been followed. The site must be inspected and prepared to be within the operating limits of the equipment. Failure to adequately prepare site could result in damage to equipment or possible injury or death to personnel.
- d. Do not attempt to start procedures if any power cords are connected to the HEAT. Failure to comply may result in injury or death to personnel and damage to equipment.
- e. During function test ensure that no crewmembers are in cab assembly. Failure to comply may result in injury or death to personnel.
- f. Improper cleaning methods and use of unauthorized cleaning solvents may result in injury to personnel and damage to equipment.

SLIDE 52

- g. Keep all related parts and components together. Do not mix parts. Failure to comply may result in damage to parts.
- h. WHEN IN DOUBT, NOTIFY YOUR SUPERVISOR. When operating with class I or II leaks, check fluid levels more frequently. Class III leaks must be reported immediately to your supervisor or to Field Maintenance. Failure to do this may result in damage to HEAT and/or components.
- i. When checking/servicing an item, ensure that all

attaching/mounting hardware is properly secured. Loose, cracked, broken, or missing hardware may result in injury to personnel or damage to equipment.

- During PMCS ensure that components and assemblies are correctly installed. Incorrect installation may cause equipment damage or failure.
 - 1. Clean HEAT as necessary before performing PMCS, lubrication, and maintenance procedures.
 - 2. Hands must be kept clean from grease, which can transfer to HEAT.
- k. Skysol 100 cleaning solvent is combustible. Use mechanical ventilation whenever product is used in a confined space, is heated above ambient temperatures, or is agitated. DO NOT use or store near heat, sparks, flame, or other ignition sources. Keep container sealed when not in use.
- I. Contact with Skysol 100 cleaning solvent may cause skin irritation. Use chemical resistant gloves. In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water. Wash contaminated clothing before reuse. Eye contact may cause irritation, tearing or blurring of vision, Use face shield or goggles when eye contact may occur. In case of eye contact, flush eyes with large amounts of water for at least fifteen (15) minutes or until irritation subsides. Inhalation may cause irritation to upper respiratory passages. DO NOT have food or drink in the vicinity. Failure to comply may result in injury to personnel.
- m. Do not allow Skysol 100 to come in contact with seals or flexible hoses. Failure to comply will result in damage to parts.

SLIDE 53

E. ENABLING LEARNING OBJECTIVE

ACTION:	HEAT performance drills	
CONDITIONS:	In the HEAT trainer with required equipment and previous training.	
STANDARDS:	Properly evacuate the HEAT while and adhering to applicable safety precautions and procedures outlined in this lesson and applicable references.	

1. Learning Step / Activity 1. Review rollover and escape actions/observe HEAT

Method of Instruction: Conference/Demonstration

Instructor to Student Ratio: 2:15
Time of Instruction: 1.5 hrs

Media: Small Group Instruction (SGI)

Observation.

- 1. Move group to the HEAT device room and break down the group into three groups of five. One group will take positions within the cab of the HEAT, the second group will observe the control panel operations, and the final group will observe both operations being conducted. As the group of five in the HEAT completes their cycle, the observation group moves into the device to perform PE while the third group of five observes the control panel operations. This rotation will continue under the control and supervision of the instructors until all persons in the groups have rotated through each station.
- 2. The group of students in the cab of the HEAT will be familiarized with the Crew Battle Drills taught in the classroom portion, ensuring that they rotate to each position within the cab. The group of students at the control panel will be familiarized on the Start, Stop and Various Degree Rotations required for training. The third group of students will be observing the conduct of both the trainer and student in regards to safety and training. Training will include a number of the 11 HEAT Training Scenarios (Located in Appendix C).
- 3. Group is in device with restraints fastened and doors locked. Conduct review/walk thru of below Drill/actions to take during and immediately following rollover and escaping from the HMMWV.
- 4. Communicate with the driver tell the driver what is to the left, right, rear and overhead. Your gunner is your eyes and ears. The gunner may be the only crewmember capable of seeing around the entire vehicle. Use the vehicle intercom system to pass visual information to the driver, but rehearse shouted voice commands and hand signals in case the intercom is inoperative. Avoid hazards, use a ground guide whenever practicable. The gunner must remain in *nametag defilade* IAW FM 21-305 (Manual for the Wheeled Vehicle Driver), TC 21-305 (Training Program for Wheeled Vehicle Accident Avoidance), TC 21-305-4 (Training Program for the High Mobility Multipurpose Wheeled Vehicle), and TC 21-306 (Tracked Combat Vehicle Driver Training).

Note: Of all the vehicle occupants, the likelihood of injury to the gunner is disproportionately higher than those of the others. Knowing the fundamental purpose of the HEAT, those occupying the gunner position must exercise particular diligence in securing occupant restraints, bracing for the rollover, and be particularly mindful of the increased potential for head and neck injuries – even in the device. Further, those occupying the gunner position in the HEAT must verify prior to each rollover iteration that the gunner hatch locking mechanism remains secure, and to avoid inadvertent disengagement of the lock during each rollover.

WARNING

If you hear the word RESCUE, immediately return HEAT to 0 $^{\rm o}$ positions. Inform crew before using side to side joystick or injury or death to personnel may occur.

5. Wear seatbelts. Survive the rollover!

6. During the roll:

- (a) **The driver drives**. Continue to navigate the vehicle as long as the controls of the vehicle influence and direct its path and speed.
- (b) The gunner must slip out of the gunner's seat, attempting to retract into the cab of the vehicle as quickly as possible. While this action doesn't eliminate the bouncing around inside the vehicle, it substantially reduces the likelihood of

decapitation, and puts the roll cage of the vehicle between the gunner and the accident site.

- (c) All others in the vehicle must make a grab for the gunner, assisting them as abruptly as necessary to get into the cab of the vehicle as quickly as possible.
- 7. Use combat locks safely. Combat locks help keep the doors closed in a crash, but are often a hazard near water. Unlock combat door locks when near water (enemy situation permitting).
- 8. Know how to get out. Rehearse vehicle evacuation as if only one exit is available. **Actual egress entails**:
 - (a) **BRACE** with one hand against the floor (what was the ceiling).
 - (i) Consider which hand you should brace with (figure which hand can reach your seatbelt, and use the other one to brace).
 - (ii) Do not unlatch your seatbelt without bracing on the floor your neck cannot support your body weight, let alone with all the *battle rattle* you have on.
 - (b) **UNFASTEN** your seatbelt with your other hand.
 - (i) Push against the floor with your bracing hand to release the tension on the seatbelt so it will unfasten.
 - (ii) Find the release button and press it firmly until it pops loose.
 - (iii) Be prepared to fall when the belt unlatches. Tuck your head, and protect your neck at all costs.
 - (c) **SLIDE** out of your seat, being sure to **disconnect your headset**.
 - (i) Remember that you cannot open the door while inverted.
 - (ii) Be aware of your buddies and don't kick them in the face.
 - (iii) Muzzle awareness at all times.
 - (iv) Be aware your gear may get caught on something.
 - (d) **ORIENT** yourself on the door.
 - (i) Dropping out of your seat is more disorienting than expected.
 - (ii) Get yourself right side up before worrying about the door.
 - (iii) Look at the door consider how it will open now that it is inverted.
 - (e) **UNLOCK AND OPEN** the door. If it doesn't open, find a door that works. Recall whether your vehicle is one with two-stage combat locks or one-stage, and the differences it takes to open each.
 - (i) Armored doors weigh 240 pounds each, and are not meant to be inverted.
 - (ii) The door may be difficult or impossible to open.
 - (iii) Once the latch is open, you will have to really lean into the door to get it open. However, if your door is not opening, try another door!
 - (iv) When you open a door, shout "Open door (and the location)!"
 - (f) **GET OUT**, but don't let your buddy down.
 - (i) Determine if all crewmembers are aware of the open door, and whether they are moving toward it.
 - (ii) Determine if all crewmembers are conscious.
 - (iii) Consider the risks of moving injured soldiers don't make the situation worse, but you can't leave them hanging upside down, nor there to drown.

- (iv) Look before you leap don't rush out the first door, only to fall off a cliff, or thrust yourself into a burning fuel or oil slick.
- 9. The **Gunner's egress** entails some specific and additional steps:
 - (a) Slide feet to the direction of roll, as the torso and legs are withdrawn to present the lowest possible profile.
 - (b) Depending on how the rear seats are occupied:
 - (i) When both rear seats are occupied, both rear seat occupants will maintain a firm grasp on the gunner, pulling the gunner down inside the vehicle through the turret assisting in restraining the gunner throughout the rollover until the vehicle has come to a stop.
 - (ii) If only one rear seat is occupied, the back seat occupant will pull the Gunner toward them, much as described above.
 - (c) Releases Gunners Restraint System/Product Improved Gunner's Restraint System and egress.

NOTE: Conduct a check on learning and summarize the learning activity.

2. Learning Step / Activity 2. HEAT PE 1

Method of Instruction: Practical Exercise (Performance)

Instructor to Student Ratio: 2:15
Time of Instruction: 1.5 hr

Media: Small Group Instruction (SGI)

Conduct PE as outlined but instructors will evaluate the students as they rotate through the stations.

NOTE: Conduct a check on learning and summarize the learning activity.

CHECK ON LEARNING: Conduct a check on learning and summarize the ELO.

SECTION IV. SUMMARY

Method of Instruction: <u>Conference / Discussion</u>

Instructor to Student Ratio is: 2:15
Time of Instruction: 5 mins

Media: Large Group Instruction

Check on Learning

Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

Review / Summarize Lesson

As each group completes the PE, move them to the debrief area, and observe them for signs of motion sickness. Given final thoughts to reinforce the training they have received, and asked their opinions of how to improve the training.

SECTION V. STUDENT EVALUATION

Testing Requirements

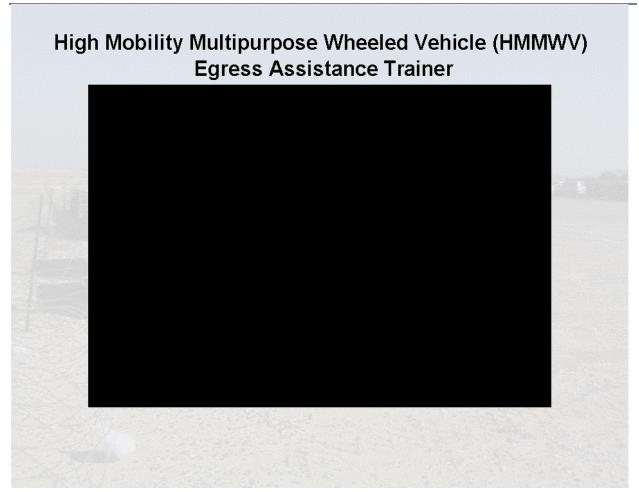
NOTE: Describe how the student must demonstrate accomplishment of the TLO. Refer student to the Student Evaluation Plan.

Feedback Requirements

NOTE: Feedback is essential to effective learning. Schedule and provide feedback on the evaluation and any information to help answer students' questions about the test. Provide remedial training as needed.

Appendix A - Viewgraph Masters

VIEWGRAPHS FOR LESSON 1: 551-HEAT version 1.0



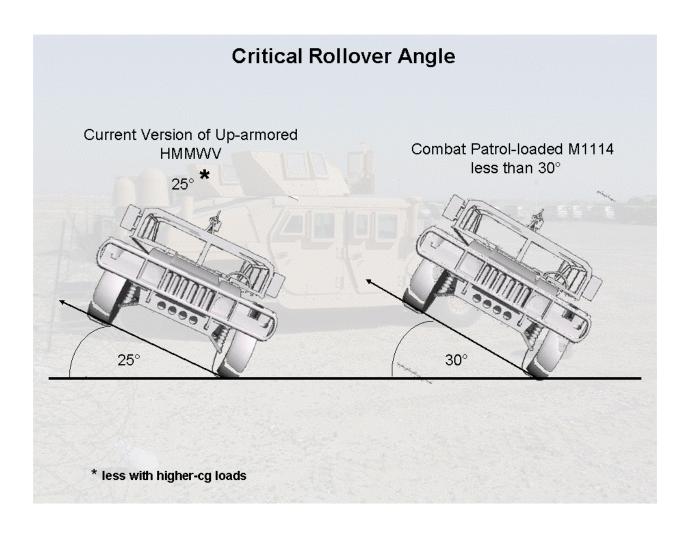
Terminal Learning Objective

Action:	Acquire certification on HEAT device to become unit Train The Trainer
Conditions:	Given the HEAT device and required instructional materials.
Standards:	Become proficient on all operations of the HEAT device, pass the hands on portion and attain 70% or higher on the written exam.

Rollover battle drills create an understanding of and how to react to the violent chaos that results when a rollover has occurred.

ENABLING LEARNING OBJECTIVE A:

ACTION:	Understand preventive measures to preclude rollover
CONDITIONS:	In a classroom, provided instruction on preventive and reactive measures, crewman duties and emergency steps to take to preclude a vehicle rollover.
STANDARDS:	Identify precautionary measures to take to prevent a HMMWV vehicle rollover by answering the check-on-learning questions posed by instructor with a minimum of 80%.



Causes of Rollovers

Rollovers are caused by

- Speed
- Inadequate training
- High centers of gravity
- Terrain
- · Road conditions,
- Driving habits
- Local conditions

Driver Risk Management Control Measures

- Adjust the vehicle speed
- Slow down
- Avoid panic
- Observe speed limit
- Do not rely on a "seat of the pants"
- Slowly accelerate
- Maintain a "space cushion"
- Avoid the temptation to brake hard

Teamwork is Key

- · Work as a team
- Maintain crew integrity
- · Communicate with the driver
- Identify terrain or conditions favorable for a rollover
- Use a guide near bodies of water
- · Position team members within the vehicle
- Combat Locks
- Know how to get out

Price of Uparmored HMMWVs

- Extremely-top heavy
- Vehicle rollovers common and deadly occurrence





Steps When Rollover Anticipated Not Into Water

Driver:

- (1) Releases the accelerator.
- (2) Shouts, "Rollover, Rollover, Rollover!"
- (3) Keeps hands on the steering wheel with arms extended but not locked.
- (4) Plants feet firmly on the floor.
- (5) Tucks head and chin into chest and braces for impact.

Vehicle Commander (VC):

- (1)Shouts, "Rollover, Rollover, Rollover!"
- (2) Uses left hand to pull gunner into the vehicle.
- (3) Uses left hand and arm to hold the gunner in place.
- (4) Plants feet firmly on the floor while holding onto a stationary object.
- (5) Tucks head and chin into chest and braces for an impact.

Steps When Rollover Anticipated Not Into Water

Gunner:

- (1) Shouts, "Rollover, Rollover, Rollover!"
- (2) Pushes/pulls self down into the vehicle.
- (3) Holds onto a stationary object.
- (4) Tucks head and chin into chest and braces for impact.
- (5) Does not place hands or fingers on turret

Other Crewmembers:

- (1) Shout, "Rollover, Rollover, Rollover!"
- (2) Assist VC to pull gunner into the vehicle and hold him.
- (3) Tuck heads and chins into chests and brace for impact.
- (4) Hold onto a stationary object.

Water Entry Is Imminent Whether Or Not The Potential For A Rollover Exists

VC: (When in the vicinity of water and tactical conditions permit)

- (1) Informs vehicle crew that the vehicle is operating around water hazards.
- (2) Reminds the crew of the risk mitigating measures.
- (3) Unlocks the combat door locks.
- (4) Ensures all loose gear and cargo are secured.

Driver:

- (1) Releases the accelerator; controls entry by steering into the body of water
- (2) Yells "Water!"
- (3) Keeps hands on the steering wheel with arms extended but not locked.
- (4) Plants feet firmly on the floor.
- (5) Tucks head and chin into chest and braces for impact.

Water Entry Is Imminent Whether Or Not The Potential For A Rollover Exists

VC:

- (1) Shouts, "Water!"
- (2) Uses left hand to pull gunner into the vehicle.
- (3) Uses left hand and arm to hold the gunner in place.
- (4) Plants feet firmly on the floor while holding onto a stationary object.
- (5) Tucks head and chin into chest and braces for an impact.

Gunner:

- (1) Yells, "Water!"
- (2) Pushes/pulls self down into the vehicle.
- (3) Slides feet in the direction of the vehicle's movement.
- (4) Plants feet firmly on the floor while holding onto a stationary object.
- (5) Tucks head and chin into chest and braces for impact.
- (6) Does not place hands or fingers on turret.

Other crewmembers (if present):

- (1) Shout, "Water!"
- (2) Assist VC to pull gunner into the vehicle and hold him.
- (3) Tuck head and chin into chest and brace for impact.
- (4) Plant feet firmly on floor while holding onto a stationary object.

ENABLING LEARNING OBJECTIVE B:

ACTION:	Understand measures to take after rollover
CONDITIONS:	In a classroom, provided instruction on reactive measures, crewman duties and emergency steps to take in case of a vehicle rollover
STANDARDS:	Identify reactive measures to take in case of a HMMWV vehicle rollover by answering the check-on-learning questions posed by instructor with a minimum of 80%.

After Rollover (Not In Water)

Each crewmember, whether driver, VC, or rear crew:

- (1) Braces one hand on the ceiling.
- (2) Unbuckles seatbelt with other hand and immediately puts both hands on ceiling.
- (3) Slides out of seat and sits up.
- (4) Disconnects headset.
- (5) Turns off motor (driver).
- (6) Orients self on the nearest door.
- (7) Unlocks combat door locks.
- (8) Opens door; if it does not open, try a different door. (Shouts Door to notify other soldiers of open door allowing egress)
- (9) Exits with weapon.
- (10) Assists remaining crew to exit.
- (11) Establishes security.
- (12) Checks for fires.
- (13) Activates fire extinguisher, as needed.
- (14) Recovers sensitive items.
- (15) Provides first aid.
- (16) Assists in vehicle recovery.

After Rollover (Not In Water) Gunner: (1) Disconnects headset. (2) Releases Gunners Restraint System/Product Improved Gunner's Restraint System (3) Orients self on the nearest door. (4) Unlocks combat door locks. (5) Opens door; if it does not open, tries a different door. (6) Exits with weapon. (7) Assists crew to exit. (8) Establishes security. (9) Checks for fires. (10) Activates fire extinguisher, as needed. (11) Recovers sensitive items. (12) Provides first aid. (13) Assists in vehicle recovery.

If Vehicle Rolls Onto Side

Lower level Soldiers, if able:

- (1) Unbuckle seat belts.
- (2) Assist upper Soldiers to unfasten seat belts then carefully lower.

Crew, if doors are jammed:

- (1) Exit through hatch or cargo area if possible.
- (2) Work as a team to open jammed doors.

After Rollover (In Water)

All crewmembers:

- (1) Turn off motor (driver).
- (2) Disconnect headsets.
- (3) Unbuckle seatbelt with other hand and immediately put both hands on ceiling.
- (4) Unlock combat door locks if not already unlocked.
- (5) Decide whether or not to remove personal equipment.
- (6) Exit the vehicle.
- (7) Assist each other to exit and secure weapons.
- (8) Assess injuries.
- (9) Get to safest shore.
- (10) Provide security.
- (11) Account for other crewmembers.
- (12) Provide/seek first aid.
- (13) Retrieve weapons, ammunition, and sensitive items.
- (14) Assist with vehicle recovery.

VC:

- (1) Accounts for weapons, ammunition, and sensitive items
- (2) Requests medical support, if required.
- (3) Reports accident.

Water Rescue Recovery Drill

- a. Rescuers secure the accident site.
- b. Stay in contact with the vehicle.
- c. Rescuers tie a rope/cable to the vehicle to aid rescue.
- d. Open doors and hatches.
- e. Turn vehicle if doors and hatches are not accessible.
- f. Seek out the highest point on vehicle.

- g. Ensure all survivors have air.
- h. Check for other injuries and apply first aid.
- i. Remove personal equipment.
- j. Move injured personnel to the highest point on the vehicle.
- k. Evacuate safest location, depending on:
 - (1) Enemy situation
 - (2) Water level and flow
 - (3) Water temperature
 - (4) Distance to water's edge
 - (5) Anticipation of rescue

- 1. A combat patrol loaded M1114, with a normal center of gravity (cg) and normal load can operate on slopes of up to:
- a. 20 degrees.
- b. 25 degrees.
- c. 30 degrees.
- d. 98.6 degrees.
- 2. The critical (rollover) angle for current version in theater up-armored HMMWV is:
- a. 20 degrees.
- b. 25 degrees.
- c. 30 degrees.
- d. 98.6 degrees.
- 3. The corrective action before reaching the critical rollover angle is:
- a. Jerk the wheel back to the center of the road.
- b. All occupants yell, "Water!"
- c. Gradually reduce speed and ease the vehicle back onto the roadway at a safe speed.
- d. Secure the coolers and secure voice radios.
- 4. During egress, you find the door you're attempting to exit won't open. You should:
- a. Inflate your water wings, kick out the windshield, and swim away from the enemy.
- b. Don't panic find a door that works.
- c. Stay put and call the Auto club.
- d. Stay put and call QRF on the secure voice radio.

5. What are the egress actions for the Gunner following a rollover on dry land?

- a. Disconnect headset, release gunner's restraint system, assess injuries, clear and check weapon, exit vehicle with weapon.
- b. Assist crew to exit, establish security, recover sensitive items, provide first aid and assist in vehicle recovery.
- c. a and b above.
- d. Leap from the vehicle before it rolls.

6. What are the immediate actions of the Driver should an entry into the water be imminent?

- a. Release the accelerator; yell "Water!" and keep hands on the steering wheel.
- b. Tuck head and chin into chest and brace for impact; and steer vehicle to control entry into the water to prevent rollover.
- c. a and b above.
- d. Leap from the vehicle before it hits the water.

7. Prior to releasing your seatbelt for egress, and immediately afterward, you must:

- a. Brace with one hand against what was the ceiling (consider which hand you should brace with) your neck cannot support your body weight during a fall; unfasten your seatbelt with the other hand.
- b. Unfasten your seatbelt with one hand, pushing firmly until it pops loose. You may have to push against the floor with your bracing hand to allow the seatbelt to unfasten.
- c. a and b above.
- d. Take out your k-bar and cut the thing off.

8. What is the purpose of the combat door lock?

- a. To prevent aggressors from entering the vehicle in a hostile area.
- b. It interfaces with the Lojack circuitry, and assists police in recovery of a stolen HMMWV.
- c. It jettisons the door if moisture is detected during a water entry.
- d. There is no difference between a combat door lock and a conventional door lock.

9. When operating near bodies of water or crossing bridges, the HMMWV crew should:

- a. Inform crewmembers of the water hazard, loosen seatbelts, slow down.
- b. Identify water hazards, unlock combat locks, remove seatbelts, slow down.
- c. Slow down, inform crewmembers of possible water hazards, unlock combat locks (enemy situation permitting).
- d. Look for alternate routes.

10. To reduce the risk of being involved in a rollover, HMMWV crews should:

- a. Check tires for proper inflation and serviceability, and slow down.
- b. Slow down, don't overload the vehicle, check condition and serviceability of tires, secure loads.
- c. Ensure operators are properly licensed.
- d. Limit crews operating in the vehicle to four or less.

11. What can gunners do to minimize their injuries when involved in a rollover?

- a. Try to jump away from the vehicle.
- b. Lower yourself and brace for impact.
- c. Yell "Rollover!" while lowering yourself into the vehicle, bracing for impact.
- d. Call the Automobile Club and complain about that last sharp curve in the road.

12. What preventive measures can be taken to minimize the chances of being involved in a rollover?

- a. Make a detailed Power Point presentation of any sharp curve in the road for emailing to your Congressman in a formal yet anonymous complaint.
- b. License and certify all crews on the HEAT, and train as a team.
- c. Slow down, avoid panic, know proper vehicle maneuvering, use caution in rural areas with soft shoulders, and identify water hazards.
- d. None of the above only tracking your number of days left in country will help.

13. Other than the driver and gunner, what are the duties of the crew in the event of a rollover?

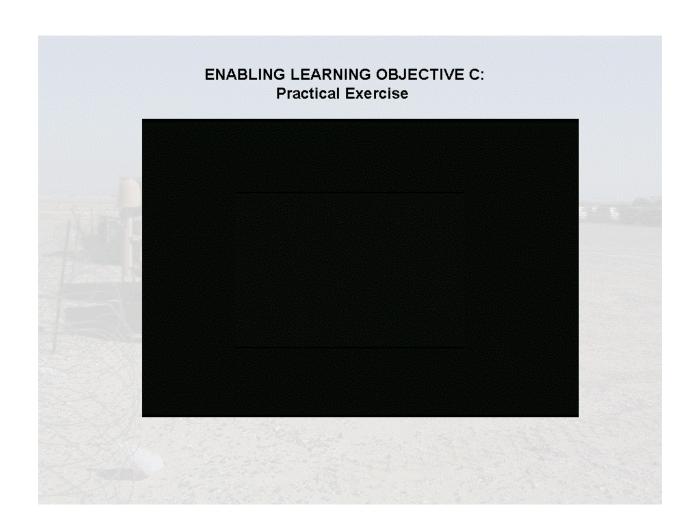
- a. Yell "Rollover!"
- b. Grab the gunner and pull them into the crew compartment.
- c. Brace for impact.
- d. All of the above.

ENABLING LEARNING OBJECTIVE C: Practical Exercise

ACTION:	HEAT operator performance drill familiarization
CONDITIONS:	In the HEAT trainer with required equipment and previous training.
STANDARDS:	Properly evacuate the HEAT while and adhering to applicable safety precautions and procedures outlined in this lesson and applicable references.

Crew/Battle Drill Descriptions

- 1. The first drill is for familiarization, pausing to highlight the 30- and 25-degree critical rollover angles and righting the device back.
- 2. The second drill shall be a "dry run" completely rolling over (inverted) no actual release of the seatbelts or gunner's harness will be made.
- 3. The third will entail inverting the device, and participants actually exiting the device, as though it had rolled on dry land.
- 4. After righting the device, crew rotating seats and re-entering the device the fourth drill will entail inverting the device, simulating a water entry.



ENABLING LEARNING OBJECTIVE D

Familiarization of HEAT components and emplacing the HEAT into initial operation

ACTION:	Familiarization of HEAT components and emplacing the HEAT into initial operation
CONDITIONS:	Given a HEAT with all applicable COEI and BII and a suitable location to place the HEAT into operation.
STANDARDS:	Properly locate a site to set up the HEAT, identify equipment needed to place the HEAT into operation, perform initial set-up, conduct function test, conduct 90 and 180 degree rotations, perform PMCS and general maintenance on the HEAT, with an understanding of risk and safety precautions associated with the HEAT, and proper storage of the HEAT.

Capabilities and Requirements

- Egress training that has unlimited rotation of rotate 360° in either direction. (**Note:** this at 90 deg, egress is thru gunners hatch only.)
- Egress training that can be conducted at 90 deg. (vehicle rolled onto either side) or at 180 deg. (vehicle rolled onto its roof) (**Note:** At 90 deg, egress is thru gunners hatch only.)
- · Cab can be stopped at any position
- · Electrical Drive System
- NPC Robotics 24-volt DC electric motor (3600 rpm; 2 hp; NEMA 56C mount) with integrated electric brake
- Textron Power Transmission Model (GEARBOX): HO60, Single Reduction Double-Enveloping Worm Gear Reducer (40:1) with integrated Double Reduction Helical Gear Reducer (26.4:1) (1056:1 Overall Ratio)
- Falk Type G82 Rigid Coupling
- Dodge SOLIDLUBE 700 Series Sleeve Bearing (Sealed Bearing)
- · Multiple Power Supply Options
- · 24-volt batteries (on board HEAT)
- NATO slave cable
- 110-volt AC (from outside source rectifier on board HEAT)
- 2 Personnel Required for Setup and Operation
 - · 1 operator for master controls
 - 1 safety observer with emergency stop control

Capabilities and Requirements (cont)

• C130 Transportable

- Height less than 102 in. (HEAT in Stowed position: 99 in.)
- Width less than 107 in. (HEAT in Stowed position: 106 in.)
- Length less than 480 in. (HEAT in Stowed position: 177 in.)
- Current HEAT weight is 13,200 Lbs.

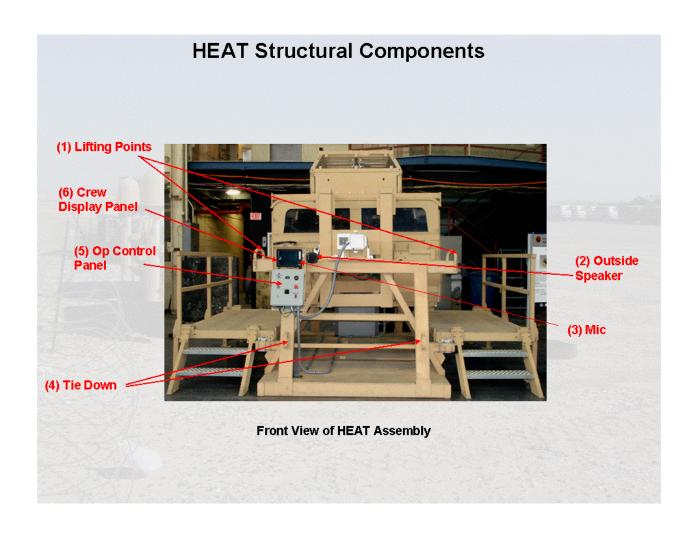
HEAT Weight and Space Requirements

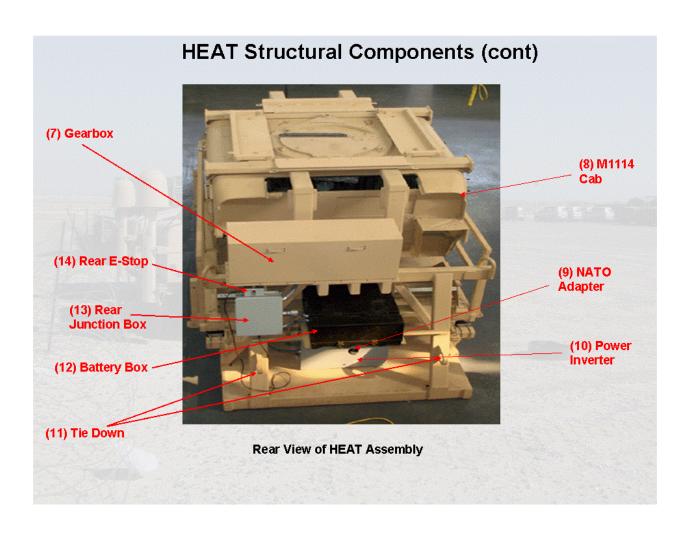
HEAT in Stowed Position

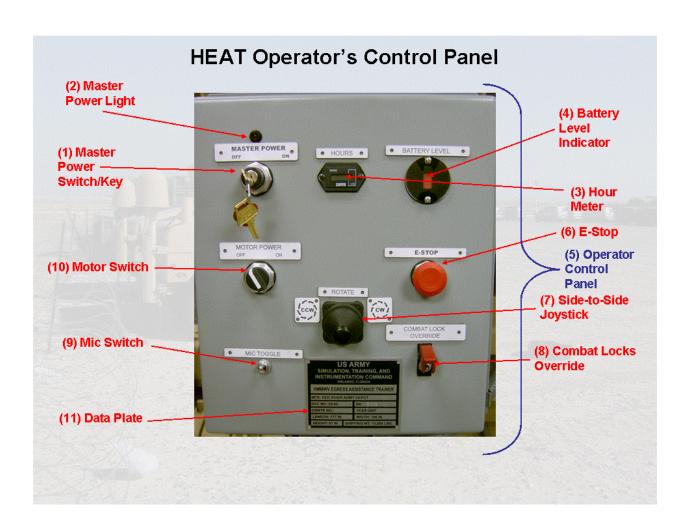
Height 97 inches
Width 106 inches
Length 177inches
Weight 13,200Lbs.

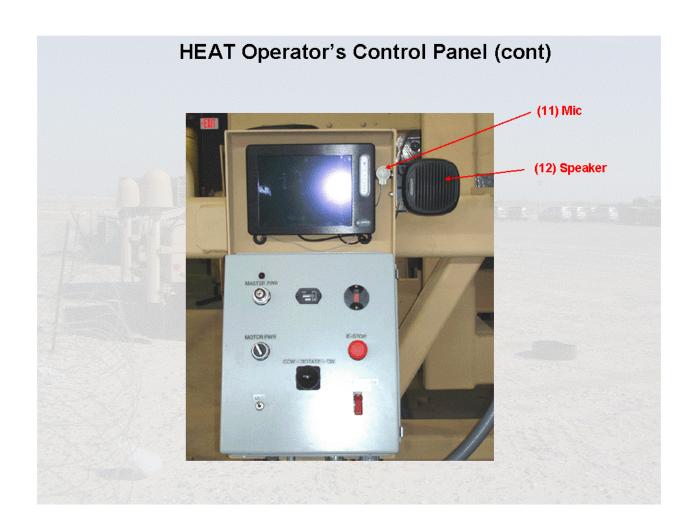
HEAT Fully Operational

Height 121 inches
Width 182 inches
Length 177inches
Weight 13,200Lbs.

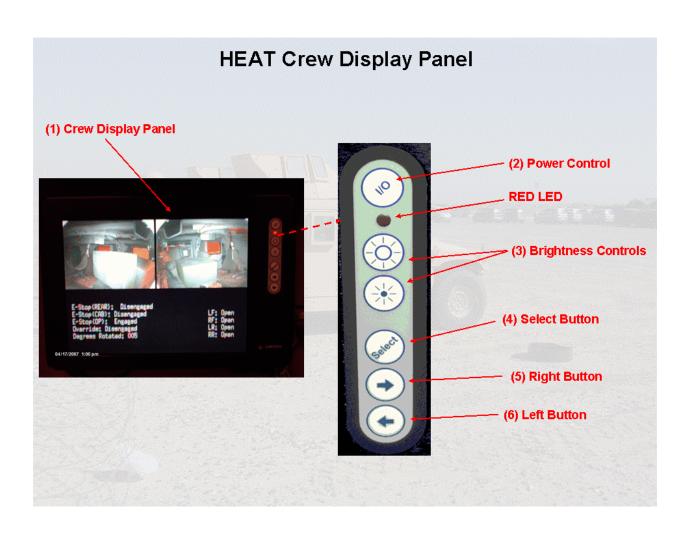


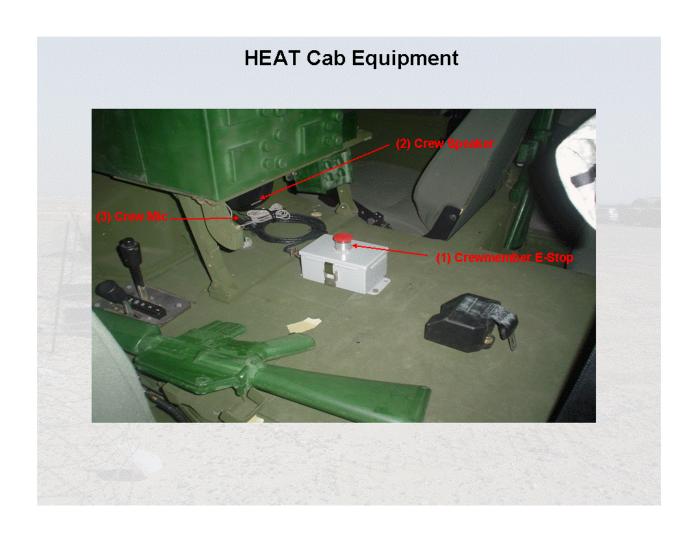


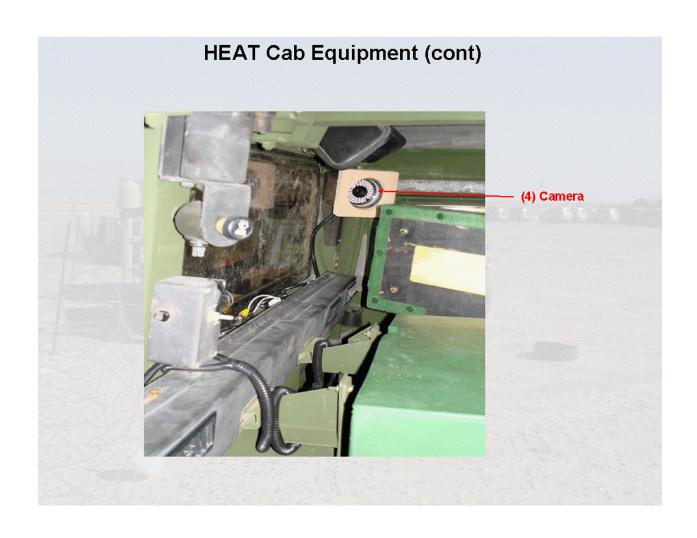


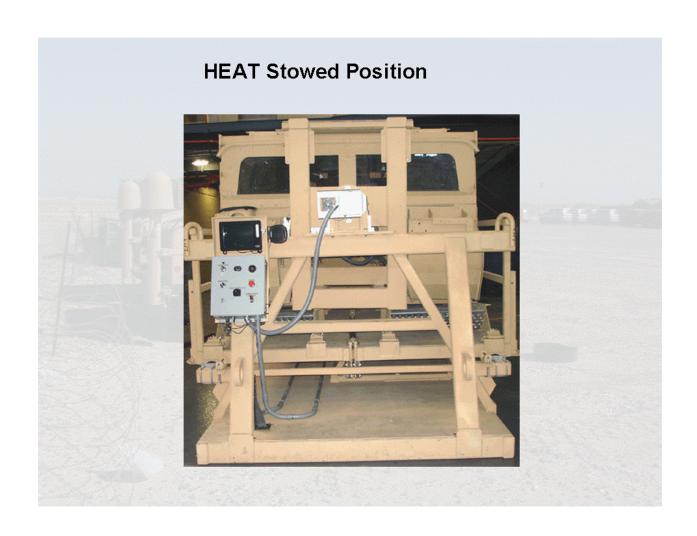


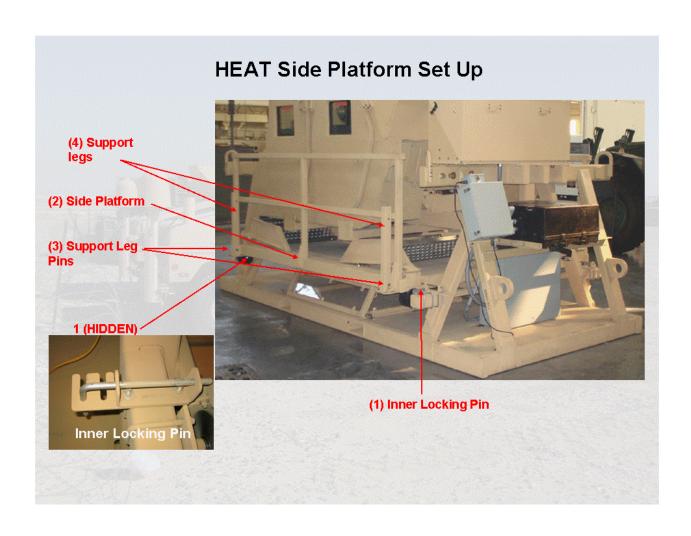


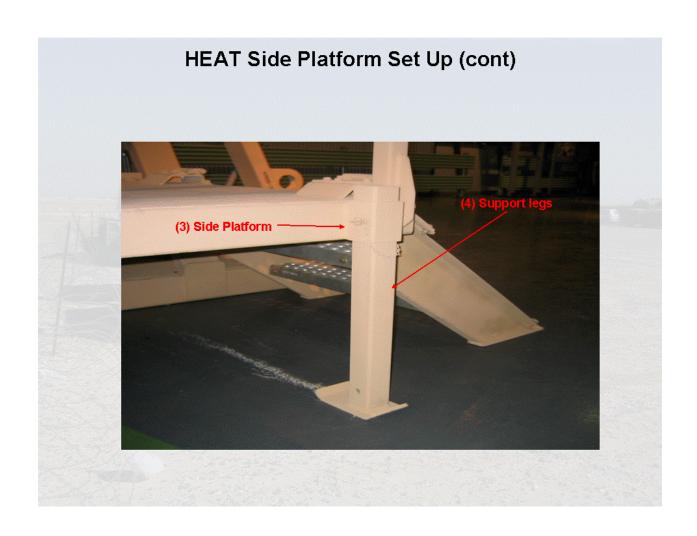


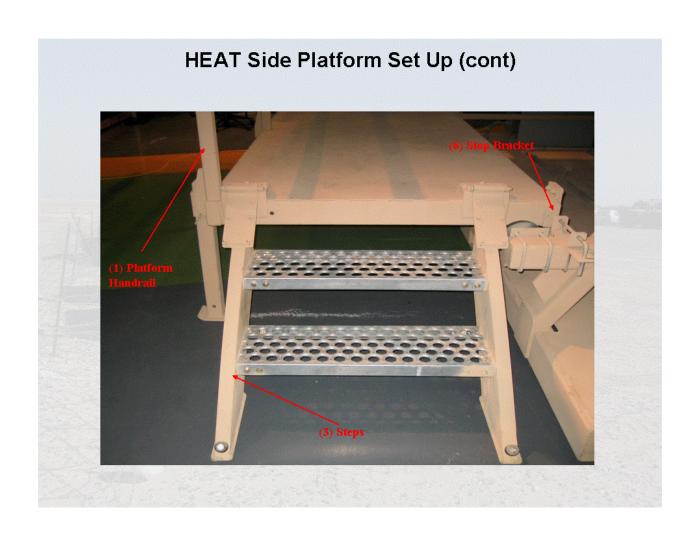


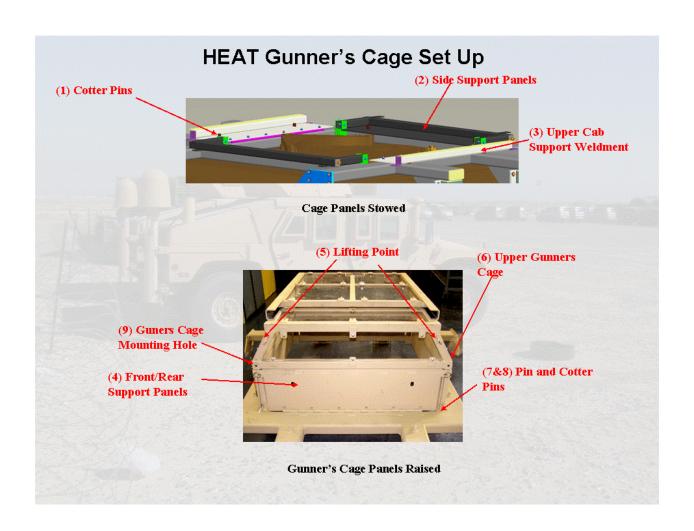


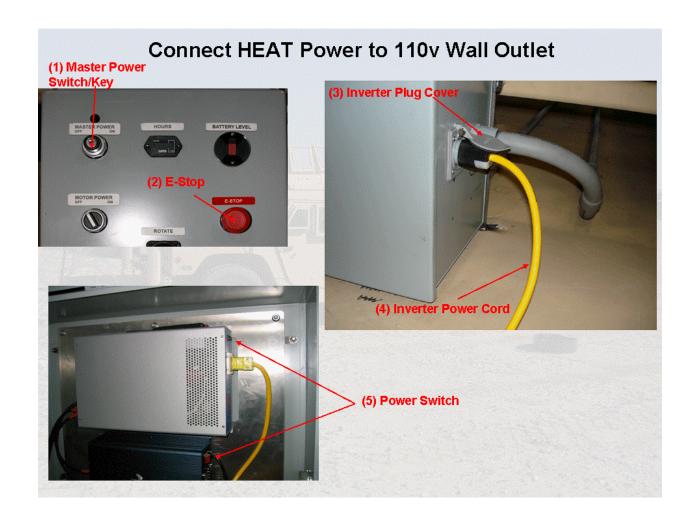












HEAT PMCS Designated Intervals and Procedures

- BEFORE checks and services of PREVENTIVE MAINTENANCE must be performed prior to
 placing vehicle or its components in operation.
- DURING checks and services of PREVENTIVE MAINTENANCE must be performed while the vehicle and/or its components/systems are in operation.
- AFTER checks and services of PREVENTIVE MAINTENANCE are performed upon completion of mission.
- WEEKLY checks and services of PREVENTIVE MAINTENANCE are performed once every 7 days.
- MONTHLY checks and services of PREVENTIVE MAINTENANCE are performed once every 30 days.
- · For troubleshooting malfunctions, refer to handout 9
- Use DA Form 2404 or DA Form 5988-E (automated) and report malfunctions to Field Maintenance at once.
- Tools included with vehicle are to be used when making PREVENTIVE MAINTENANCE checks and services.
- Wiping cloths are needed to remove dirt or grease.
- Refer to appropriate TMs for PMCS requirements on mounted systems (i.e., missiles systems, radios, etc.).

HEAT PMCS Trouble Spots

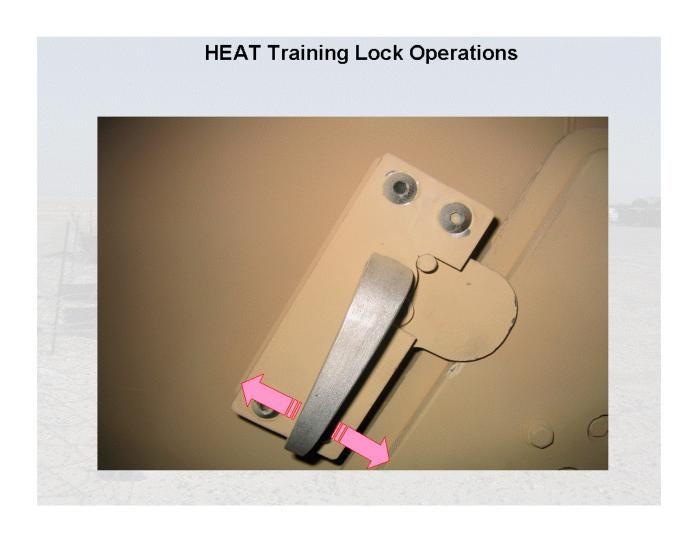
- Check all bolts, nuts, and screws. If loose, bent, broken, or missing, either tighten or report conditions to field maintenance.
- Look for loose or chipped paint, and rust or cracks at welds. Remove rust and loose paint, and spot-paint
 as required. If a cracked weld is found, report situation to field maintenance.
- Inspect electrical wires and connectors for cracked or broken insulation. Also look for bare wires and loose
 or broken connections. Tighten loose connections. Report other problems to Field Maintenance.
- · Check hinges for security and operation.
- Check data, caution, and warning plates for security and legibility.
- Not Ready/Available.
 - If a vehicle is not able to perform the mission, equipment will be reported as not ready/available.
 Refer to DA Pam 738-750.
- · Correct Assembly or Stowage.
 - Check each component for installation as an assembly, that it is in the right place, and has no missing parts.
- Wetness around seals, gaskets, fittings, or connections indicates leakage. A stain also denotes leakage. If a fitting or connector is loose, tighten it. If broken or defective, report it. Use the following as a guide:
- Class I. Leakage indicated by wetness or discoloration, but not great enough to form drops.
- Class II. Leakage great enough to form drops, but not enough to cause drops to drip from item being checked/inspected.
- Class III. Leakage great enough to form drops that fall from the item being checked/inspected.

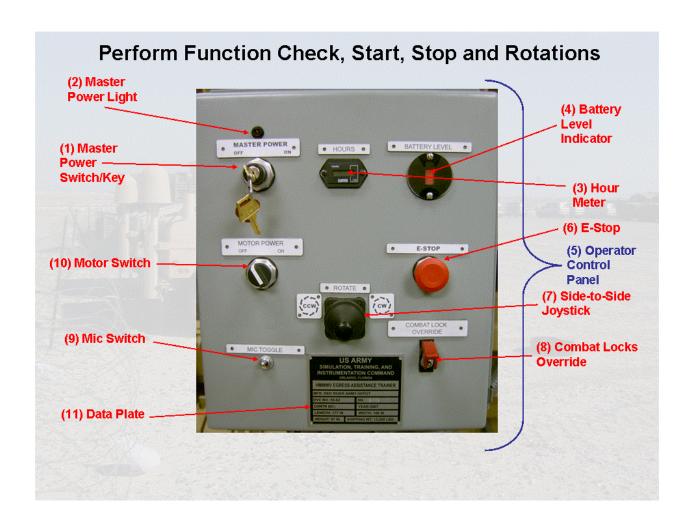


Perform Single Handle Latch and Lock Operations (cont)

Perform Single Handle Latch and Lock Operations (cont)

Perform Single Handle Latch and Lock Operations (cont) Rolling Down





HEAT Set Up Risks

- Risk Management for this training is Moderate
 - CRM is a decision-making process used by leaders to mitigate risks associated with all hazards
 that can injure or kill people, damage or destroy equipment, or otherwise impact mission
 effectiveness. CRM must be accomplished using appropriate composite risk management
 worksheet in the Handouts (8&9) section of this TSP prior to the conduct of this training
- HEAT operators must be trained and certified by competent personnel. As such, commanders must determine who is qualified to train the HEAT operator(s). Commanders may assign other competent personnel (military, civilian technician, or contractors) as HEAT instructor/operator. Ideally, someone who is already a driver trainer or has experience as an instructor or safety officer/NCO may be designated by the commander as a HEAT instructor/operator. Instructor/operators must be selected not only for their technical qualifications but also for their demonstrated performance, objectivity, and ability to observe and provide constructive comments

HEAT Safety Factors to Consider

- Ensure that the power outlet being used for the HEAT is powered by a minimum of a 15-amp circuit breaker. Failure to comply may result in injury or death to personnel or damage to equipment.
- All control switches must be in the off position before connecting power cord to wall outlet. Failure to place control switches in the off position may result in injury or death to personnel.
- Before starting procedures ensure SITE REQUIREMENTS AND LAYOUTS has been followed. The site must be inspected and prepared to be within the operating limits of the equipment. Failure to adequately prepare site could result in damage to equipment or possible injury or death to personnel.
- Do not attempt to start procedures if any power cords are connected to the HEAT. Failure to comply may result in injury or death to personnel and damage to equipment.
- During function test ensure that no crewmembers are in cab assembly. Failure to comply may result in injury or death to personnel.
- Improper cleaning methods and use of unauthorized cleaning solvents may result in injury to personnel and damage to equipment.

HEAT Safety Factors to Consider (cont)

- Keep all related parts and components together. Do not mix parts. Failure to comply may result in damage to parts.
- WHEN IN DOUBT, NOTIFY YOUR SUPERVISOR. When operating with class I or II leaks, check fluid levels more frequently. Class III leaks must be reported immediately to your supervisor or to Field Maintenance. Failure to do this may result in damage to HEAT and/or components.
- When checking/servicing an item, ensure that all attaching/mounting hardware is properly secured. Loose, cracked, broken, or missing hardware may result in injury to personnel or damage to equipment.
- During PMCS ensure that components and assemblies are correctly installed. Incorrect installation may cause equipment damage or failure.
- Skysol 100 cleaning solvent is combustible.
 - •Contact with Skysol 100 cleaning solvent may cause skin irritation.
 - •Do not allow Skysol 100 to come in contact with seals or flexible hoses. Failure to comply will result in damage to parts.

ENABLING LEARNING OBJECTIVE E: Practical Exercise

ACTION:	HEAT performance drills
CONDITIONS:	In the HEAT trainer with required equipment and previous training.
STANDARDS:	Properly evacuate the HEAT while and adhering to applicable safety precautions and procedures outlined in this lesson and applicable references.

Crew/Battle Drill Descriptions

- 1. The first drill is for familiarization, pausing to highlight the 30- and 25-degree critical rollover angles and righting the device back.
- 2. The second drill shall be a "dry run" completely rolling over (inverted) no actual release of the seatbelts or gunner's harness will be made.
- 3. The third will entail inverting the device, and participants actually exiting the device, as though it had rolled on dry land.
- 4. After righting the device, crew rotating seats and re-entering the device the fourth drill will entail inverting the device, simulating a water entry.

Appendix B - Test(s) and Test Solution(s) (N/A)

Appendix C - Practical Exercises and Solutions

PRACTICAL EXERCISE(S)/SOLUTION(S) FOR LESSON 1: 551-HEAT version 1.0

PRACTICAL EXERCISE SHEET HEAT PE 1

Title

High Mobility Multipurpose Wheeled Vehicle (HMMWV) Egress Assistance Trainer (HEAT)

Lesson Number / Title

551-HEAT version 1.0 / High Mobility Multipurpose Wheeled Vehicle (HMMWV) Egress Assistance Trainer (HEAT)

Introduction

The purpose of the HEAT PE is to simulate an uparmored HMMWV rollover or roll to left or right, then train the vehicle occupants to successfully egress from the rolled HMMWV by emphasizing teamwork through crew/battle drills.

Motivator

A study reported by *Helicopter World* (now *Defense Helicopter*) magazine in September 2000 said a person who is "egress trained" stands a 250 percent greater chance of survival than an untrained occupant when faced with a rollover egress emergency.

Teaching Soldiers, under controlled training conditions, the proper procedures to egress from an inverted high mobility multipurpose wheeled vehicle (HMMWV) will allow them to achieve self-control and overcome the natural fear and panic following the vehicle rollover. It will also reduce casualties and fatalities resulting from such rollovers, even when the vehicle is under attack, underwater, or on fire.

Terminal Learning Objective

NOTE: The instructor should inform the students of the following Terminal Learning Objective covered by this practical exercise.

At the completion of this lesson, you [the student] will:

Action:	Perform clearing and egress procedures with the HEAT.
Conditions:	In the HEAT wearing required combat equipment, given instruction
	on actions to take to preclude and reactive measures during/after a
	HMMWV rollover as a HMMWV crewmember.
Standards:	Properly evacuate the HEAT while adhering to applicable safety
	precautions and procedures outlined in this lesson and applicable
	references.

Safety Requirements

Medical pre-screening. HEAT training undertaken while being treated by prescription medications, must be done so with the knowledge and approval of the treating physician.

Safety hazard awareness notice. A potential for a mishap during HEAT training is acknowledged. In order to ensure the safety of staff and HEAT Training participant(s), the following considerations will be addressed. In the event of motion discomfort, the individual – or the unit to which the individual belongs – will be responsible for cleaning the physical evidence (i.e., the release of *any* bodily fluid or compound) of such discomfort before training will continue.

Hazardous conditions and control measures. Students must be informed of any known hazardous conditions and control measures that exist in the training environment. All watches, rings, and jewelry worn around the neck shall be

removed; pagers or cell phones removed; and all pockets emptied of contents – particularly pens, pencils and pocket knives. Earrings should be removed to prevent inadvertent tearing of the earlobe during inversion and egress from the device. Crewmembers must be briefed of their responsibility to report any unsafe/unhealthful condition they may discover. The instructor will identify the location of emergency equipment, fire exits, and local procedures to be used in the event of a fire, injury, or other emergency. In the event of an **in-HEAT emergency**, (**three blasts** on the whistle or sounding of applicable alarm) **exit the HEAT** immediately and proceed to the pre-designated location. A <u>single long blast</u> is an indication to <u>remain inside the device and *not* open the doors.</u>

First aid treatment includes oxygen (O) administration, treatment for shock, Cardiopulmonary Resuscitation (CPR) when needed, and transport to the nearest medical treatment facility IAW the Pre-Mishap Plan (Handout 1).

Pre-training requirements. Prior to engaging in HEAT training, personnel shall be proficient with the wear and operation of standard uniform and combat equipment worn in the theater, and be familiar with survival, signaling and rescue techniques appropriate to survival situations typical of disabled vehicles in the AOR.

Emergency medical personnel. There will be a minimum of one Combat Lifesaver (CLS) on site during any operation of the HEAT. Ideally, CLS services will be provided by the unit undergoing the training. Emergency medical personnel with appropriate equipment and a suitable vehicle for transport will be readily available during all HEAT training. The absence of any criteria in this paragraph requires a reassessment of the risk and the approval of the appropriate risk approval authority.

Safety reminder. All personnel will be reminded that personal injury, death, or equipment damage can result from carelessness, failure to comply with the approved procedures, or violations of warnings, cautions, and safety regulations.

HEAT location safeguards. The HEAT device will be isolated from passers-by to prevent accidental striking by the device when it is in motion.

Risk Assessment

Moderate - CRM is a decision-making process used by leaders to mitigate risks associated with all hazards that can injure or kill people, damage or destroy equipment, or otherwise impact mission effectiveness. CRM must be accomplished using appropriate composite risk management worksheet in the Handout section of this TSP prior to the conduct of this training.

Environmental Considerations

Environmental Exposure – Air crewmembers should not participate in flight duties for at least eight hours after completion of HEAT training to ensure stability in the otolith organs of the vestibular system, Aviation/Flight Safety Program and Aviation Accident Prevention Plan {AAPP}, para. 4-9d(1); and FM 3-04.301 Aeromedical Training for Flight Personnel, Chapter 9.

Evaluation

Debrief. As the group moves to the debrief, they are observed for signs of motion sickness, given final thoughts from the instructor to reinforce the training they have received, and asked their opinions of how to improve the training.

Instructional

Knowing what actions to take immediately prior to a potential rollover and

Lead-In

immediately following a rollover are vital to the safety of the vehicle's crew. Rollover battle drills, based on unit standing operating procedures (SOP), routinely performed by the vehicle's crew, create understanding of the violent chaos that results when a rollover has occurred and develop skills needed to react to it..

Resource Requirements

Instructor Materials: This TSP, TC 55-HEAT

Student Materials:

Special Instructions

Conduct HEAT set-up procedures (Handout 8) and PMCS inspection checklist of the HEAT (Handout 4) prior to start of Practical Exercise

- a. Demonstrate rollover of device while empty. Observe rollover rate and check for free-floating and unsecured obstacles within the device.
- b. Inspect the seatbelts and restraints for condition, security, and ease of operation at each position in the HEAT.
- c. Ensure that the motor controls and electrical connections of the HEAT to the building's electrical outlets are secure and serviceable per theater safety standards.
- d. The senior HEAT instructor on duty will certify in the logbook that the daily and before-use checks for the device have been completed and that no weekly, monthly, quarterly, or annual inspections/services are overdue.

Procedures

HEAT CREW/BATTLE DRILLS

Crew/Battle Drill Descriptions

- 1. The first drill is for familiarization, pausing to highlight the 30- and 25-degree critical rollover angles and righting the device back.
- 2. The second drill shall be a "dry run" completely rolling over (inverted) no actual release of the seatbelts or Gunner's Restraint System/Product Improved Gunner's Restraint System harness will be made.
- 3. The third will entail inverting the device, and participants actually exiting the device, as though it had rolled on dry land.
- 4. After righting the device, crew rotating seats and re-entering the device the fourth drill will entail inverting the device, simulating a water entry.

INSTRUCTOR PROCEDURES

Conduct all 4 Crew/Battle Drills with each group rotating through the HEAT device

Two HEAT instructors will be present at all times the device is in use. The front instructor (device operator) controls the electric motor for roll operations. Both operators will do a complete walk-around of the device prior to each roll to verify that doors are closed, gunner's hatch mechanism is locked, and crewmembers are in their seats with their seat belts securely fastened. Prior to device operation, both instructors will position themselves on opposite ends of the device, diagonally across from each other, to allow a clear and unobstructed view of both sides of the device to ensure doors remain closed throughout the roll cycle.

The following safety checks must be conducted prior to the start of any training.

Perform safety checks

- Ensure the Gunners cage slider door is in the closed position.
- Ensure the Gunner's hatch on M1114 cab is in the open locked position
- Ensure all windows are up and in the locked position. Have crewmembers response that their window is up and in the locked position.
- Ensure that no personnel or objects are within 6 ft of HEAT assembly during rotation.
- Ensure all personnel are secured to cab assembly using seat belt. Have crew respond seat belts are secure.
- Ensure all doors are combat locked. Have crewmembers confirm the doors are secure. Verify doors are combat locked from the crew display panel.
- Check with assistant operator/trainer that all is clear.
- Check that motor switch is in the off position.
- 1. The VC position will always be manned if there is more than one person in the device. The VC is responsible for ensuring all personnel within the HEAT are buckled in, the gunner is properly restrained, and the combat locks are engaged on all doors.
- 2. The device operator communicates using the intercom system with the HEAT occupants verifying all seatbelts are secured and ensures display screen indicates all doors are locked. Identify E-stops inside HEAT to ensure occupants understand how to stop the device in case of emergency.
- 3. Once all positions report ready to the HEAT operator, they will use the intercom system to signal rotation is about to begin. They will then notify the assistant instructor and only then is the device ready for operation.
- 4. When the crewmembers are ready, the device operator rotates the simulator either to the left or to the right. Crewmembers should lower their chins to their chests, pull their arms across their chests, and brace their legs against the floor without locking their knees. Once the rolling has stopped and the device is in the desired position to complete the crew/battle drill, the HEAT operator uses the intercom system to signal to Crewmembers to begin the drill. Crew-members should wait three to five seconds to orient themselves; brace against the ceiling with one hand, then release the restraint belts with their other hand. Next, they will pull down free of the seat and rotate to a horizontal face-down position while holding onto a reference point with both hands. The crew then proceeds with an egress per the scenario for the exercise.

SOLUTION FOR PRACTICAL EXERCISE SHEET HEAT PE 1

Sample Training Scenarios

NOTES: Prior to all Scenarios, students shall conduct a pre-rotation check of their gear by using the "buddy system". Any loose or hanging items should be fixed or removed at this time.

Scenario 1 - Orientation Scenario

NOTES: This scenario should be used to identify any potential for students to experience motion sickness or claustrophobia. This scenario should be done at the beginning of every groups training session.

- 1. Rotate the trainer and stop at 25°. Identify this as the critical rollover angle of the uparmored HMMWV.
- 2. Asses Students for any Illness or problems
- 3. Rotate the trainer and stop at 90°
- 4. Asses Students for any Illness or problems
- 5. Rotate the trainer and stop at 180°
- 6. Asses Students for any Illness or problems
- 7. Rotate trainer and stop at 360°
- 8. Scenario complete

Scenario 2- HMMWV Rollover to 180° BASIC

NOTES: *After the vehicle has come to a resting position the lead instructor will only unlock the driver's door. When students egress out of the vehicle, make sure they only use the vehicles frame to egress.

- 1. Rotate the trainer 180°
- 2. Stop the trainer at the 180° position.
- 3. *Unlock only one of the doors.
- 4. Signal students to egress the vehicle
- 5. Observe and assist students as required.
- 6. After egressing have students set up security and conduct accountability checks.
- 7. Conduct After Action Review

Scenario 3 - IED explosion causes HMMWV rollover to 180° with (1) injured but conscious Soldier

NOTES: Before the students load the vehicle, identify and instruct one of the students that he/she will be simulating an injured soldier. Instruct the student to verbalize an injury when the vehicle comes to a rest. Instruct the "injured soldier" that they are to offer absolutely no help to the other students. The other students will have to get him/her out of the seatbelt and vehicle

*After the vehicle has come to a resting position the lead instructor will only unlock one door. This is done to simulate jammed or damaged doors that cannot be opened.

- 1. Rotate the trainer
- 2. Stop the trainer at the 180° position.
- 3. *Unlock only one of the doors.
- 4. Signal students to egress the vehicle
- 5. Observe and assist students as required.
- 6. After egressing have students set up security, treat/request MEDEVAC for casualties and conduct accountability checks.
- 7. Conduct After Action Review

Scenario 4 - IED explosion causes HMMWV rollover to 180° with (2) injured but conscious Soldiers

NOTES: Before the students load the vehicle, identify and instruct two of the students that they will be simulating injured soldiers. Instruct the students to verbalize an injury when the vehicle comes to a rest. Instruct the "injured soldiers" that they are to offer absolutely no help to the other students. The other students will have to get them out of the seatbelt and vehicle.

*After the vehicle has come to a resting position the lead instructor will only unlock one door. This is done to simulate jammed or damaged doors that cannot be opened.

- 1. Rotate the trainer
- 2. Stop the trainer at the 180° position.
- 3. *Unlock only one of the doors.
- 4. Signal students to egress the vehicle
- 5. Observe and assist students as required.
- 6. After egressing have students set up security, treat/request MEDEVAC for casualties and conduct accountability checks.
- 7. Conduct After Action Review

Scenario 5 - IED explosion causes HMMWV Rollover to 180° with (1) injured and unconscious Soldier

NOTES: Before the students load the vehicle, identify and instruct one of the students that he/she will be simulating an unconscious soldier. Instruct the student to do absolutely nothing when the trainer comes to a rest. Ensure the "unconscious soldier" does not speak or offer any type of help to the other students. The other students will have to get him/her out of the seatbelt and vehicle.

- * After the vehicle has come to a resting position the lead instructor will only unlock one door. This is done to simulate jammed or damaged doors that cannot be opened.
 - 1. Rotate the trainer
 - 2. Stop the trainer at the 180° position.
 - 3. *Unlock the driver's door.
 - 4. Signal students to egress the vehicle
 - 5. Observe and assist students as required.
 - 6. After egressing have students set up security, treat/request MEDEVAC for casualties and conduct accountability checks.
 - 7. Conduct After Action Review

Scenario 6 - IED explosion causes HMMWV Rollover to 180° with (2) injured and unconscious Soldier

NOTES: Before the students load the vehicle, identify and instruct two of the students that they will be simulating unconscious soldiers. Instruct the students to do absolutely nothing when the trainer comes to a rest. Ensure the "unconscious soldiers" do not speak or offer any type of help to the other students. The other students will have to get them out of the seatbelt and vehicle.

- * After the vehicle has come to a resting position the lead instructor will only unlock one door. This is done to simulate jammed or damaged doors that cannot be opened.
 - 1. Rotate the trainer
 - 2. Stop the trainer at the 180° position.
 - 3. *Unlock the driver's door.
 - 4. Signal students to egress
 - 5. Observe and assist students as required.
 - 6. After egressing have students set up security, treat/request MEDEVAC for casualties and conduct accountability checks.
 - 7. Conduct After Action Review

WARNING: 90° Egress is extremely dangerous and must only be conducted with the approval of the commander. An additional risk assessment must be done prior to the conduct of any 90° Egress training being started. Egress will only be done through the Gunner's Hatch.

Scenario 7- HMMWV Rollover to 90° BASIC

NOTES: *After the vehicle has come to a resting position the lead instructor will only unlock the driver's door. When students egress out of the vehicle, make sure they only use the vehicles frame to egress.

- 1. Rotate the trainer
- 2. Stop the trainer at the 90° position.
- 3. Signal students to egress the vehicle
- 4. Observe and assist students as required.
- 5. After egressing have students set up security and conduct accountability checks.
- 6. Conduct After Action Review

WARNING: 90° Egress is extremely dangerous and must only be conducted with the approval of the commander. An additional risk assessment must be done prior to the conduct of any 90° Egress training being started. Egress will only be done through the Gunner's Hatch.

Scenario 8- IED explosion causes HMMWV rollover to 90° with (1) injured but conscious Soldier

NOTES: Before the students load the vehicle, identify and instruct one of the students that he/she will be simulating an injured soldier. Instruct the student to scream when the vehicle comes to a rest. Instruct the "injured soldier" that he/she is to offer absolutely no help to the other students. The other students will have to get him/her out of the seatbelt and vehicle.

*After the vehicle has come to a resting position the lead instructor will only unlock the driver's door. When students egress out of the vehicle, make sure they only use the vehicles frame to egress.

- 1. Rotate the trainer
- 2. Stop the trainer at the 90° position.
- 3. Signal students to egress the vehicle
- 4. Observe and assist students as required.
- 5. After egressing have students set up security, treat/request MEDEVAC for casualties and conduct accountability checks.
- 6. Conduct After Action Review

WARNING: 90° Egress is extremely dangerous and must only be conducted with the approval of the commander. An additional risk assessment must be done prior to the conduct of any 90° Egress training being started. Egress will only be done through the Gunner's Hatch.

Scenario 9 - IED explosion causes HMMWV rollover to 90° with (2) injured but conscious Soldiers

NOTES: Before the students load the vehicle, identify and instruct two of the students that they will be simulating injured soldiers. Instruct the students to scream when the vehicle comes to a rest. Instruct the "injured soldiers" that they are to offer absolutely no help to the other students. The other students will have to get them out of the seatbelt and vehicle.

*After the vehicle has come to a resting position the lead instructor will only unlock the driver's door. When students egress out of the vehicle, make sure they only use the vehicles frame to egress.

- 1. Rotate the trainer
- 2. Stop the trainer at the 90° position.
- 3. Signal students to egress the vehicle
- 4. Observe and assist students as required.
- 5. After egressing have students set up security, treat/request MEDEVAC for casualties and conduct accountability checks.
- 6. Conduct After Action Review

WARNING: 90° Egress is extremely dangerous and must only be conducted with the approval of the commander. An additional risk assessment must be done prior to the conduct of any 90° Egress training being started. Egress will only be done through the Gunner's Hatch.

Scenario 10- IED explosion causes HMMWV Rollover to 90° with (1) injured and unconscious Soldier

NOTES: Before the students load the vehicle, identify and instruct one of the students that he/she will be simulating an unconscious soldier. Instruct the student to do absolutely nothing when the trainer comes to a rest. Ensure the "unconscious soldier" does not speak or offer any type of help to the other students. The other students will have to get him/her out of the seatbelt and vehicle.

- * After the vehicle has come to a resting position the lead instructor will only unlock the driver's door. When students egress out of the vehicle, make sure they only use the vehicles frame to egress.
 - 1. Rotate the trainer
 - 2. Stop the trainer at the 90° position.
 - 3. Signal students to egress the vehicle
 - 4. Observe and assist students as required.
 - 5. After egressing have students set up security, treat/request MEDEVAC for casualties and conduct accountability checks.
 - 6. Conduct After Action Review

WARNING: 90° Egress is extremely dangerous and must only be conducted with the approval of the commander. An additional risk assessment must be done prior to the conduct of any 90° Egress training being started. Egress will only be done through the Gunner's Hatch.

Scenario 11 - IED explosion causes HMMWV Rollover to 90° with (2) injured and unconscious Soldier

NOTES: Before the students load the vehicle, identify and instruct two of the students that they will be simulating unconscious soldiers. Instruct the students to do absolutely nothing when the trainer comes to a rest. Ensure the "unconscious soldiers" do not speak or offer any type of help to the other students. The other students will have to get them out of the seatbelt and vehicle

*After the vehicle has come to a resting position the lead instructor will only unlock the driver's door. When students egress out of the vehicle, make sure they only use the vehicles frame to egress.

- 1. Rotate the trainer
- 2. Stop the trainer at the 90° position.
- 3. Signal students to egress the vehicle
- 4. Observe and assist students as required.
- 5. After egressing have students set up security, treat/request MEDEVAC for casualties and conduct accountability checks.
- 6. Conduct After Action Review

Appendix D - Student Handouts

HANDOUTS FOR LESSON 1: 551-HEAT version 1.0

Handout 1

HEAT PRE-MISHAP PLAN

Instructions: The blank spaces are to be completed prior to undertaking any training in the HEAT, and this form is *conspicuously posted* for ready reference in the event of a mishap.

Vision blurriness consistent with red-out (from inversion) Chest pain or headache (consistent with cardio distress or stroke) Flank or chest pain Numbness/tingling in extremities Dipnea (shortness of breath) Any cut, abrasion or bruise (not known to be from an
stroke) Flank or chest pain Numbness/tingling in extremities Dipnea (shortness of breath)
Numbness/tingling in extremities Dipnea (shortness of breath)
Dipnea (shortness of breath)
Any cut, abrasion or bruise (not known to be from an
impact)
Crushing, pinching, or punctures known not to be from an impact
d: ble - Oxygen by mask.
ıl

- 4. All injuries no matter how slight must be reported. This assists in the development of
- administrative and engineering controls necessary to avoid future mishaps. All damage to the device must be reported.

Handout 2

CLASS E MISHAP REPORTING FORM

SECURITY CLASSIFICATION OF FORM

(For use in reporting non-aviation mishaps costing the Government less than \$2,000, or not otherwise qualifying as a Class D mishap. Not for use in reporting Class E Army Aviation mishaps, which are required to be reported on a DA Form 2379-AB-R [Abbreviated Aviation Accident Report (AAAR)] IAW DA Pam 385-40).

Date and Local Time of Mishap:	
2. Location of Mishap (address, building num	ber and installation, grid, etc.):
them as "1.", "2", etc. Specify whether the injustrate "None".	cut finger"), if any. If more than one injured person, list ury is a HEAT impact or non-impact injury. If no injuries,
SGT Adam Burkholder; 2b. SFC Richard Wo	,
5. Indicate any military or civilian equipment of	damaged, and describe the damage. If none, write "None".
6. Describe what happened, and the events t necessary.	hat led up to the mishap. Use additional sheets of paper if
7. How do you think this mishap could have b	peen prevented?
8a. Rank and Name of person reporting mishap:	
8b. Phone number (DSN or commercial) where you may be reached.	
DO NOT WRITE BELOW THIS LINE – FOR U	JSE BY SAFETY OFFICE(R).
9a. Rank and Name of Safety Officer receiving and investigating mishap:	
9b. Date received:	
9c. Date Investigation completed, filed:	
9d. Cross-referenced LODs or other mishap reports (e.g., SFs 91, AGARs):	

FORM ROUTING: Unit Safety Officer review and complete form, route $\underline{through}$ Command Channels \underline{to} Safety Officer

Handout 3

	HEAT TRAINING PARTICIPANT SCREENING SHEET		
Name:	(Last, First MI):		
SSN:	Rank:		
Unit:	Age: Date of Last Physical:		
	,		
Trainir	ng: Initial/Refresher Medical Status (Profiles):		
1	Have you been physically ill in the last two weeks?	Υ	N
2	Have you taken any medications in the last 24 hours?	Υ	N
3	Are you presently under any medical treatment or (aircrews) have you been	Υ	N
	medically grounded in the last 30 days?		
4	Have you had any shots or immunizations in the past 12 hours?	Υ	N
5	Have you had any dental work in the past seven days?	Υ	N
6	Have you donated blood in the last seven days?	Υ	N
7	Have you had less than your normal amount of sleep in the last two nights?	Υ	N
8	Have you had any alcohol in the last 12 hours?	Υ	N
9	Have you changed your eating habits in the last 24 hours?	Υ	N
10	Do you have any physical condition which might be aggravated by this	Υ	N
	training?		
11	Have you had any back or joint trouble in the last 30 days?	Υ	N
12	Have you had any head, neck, back, or any major previous bone fracture?	Υ	N
	If an have you been released for such activity by a Competent Medical	Υ	N
	If so, have you been released for such activity by a Competent Medical	Ť	IN
	Authority?		
13	For women: Are you pregnant?	Υ	N
14	Do you have any physical condition not noted above?	Υ	N
15	Have you ever had a traumatic experience in vehicles and/or do you have any	Υ	N
	fear associated with being in a tactical vehicle, such as a HMMWV?		
16	Is there any reason why you should not participate in training today?	Υ	N
17	Have you previously requested to drop from any HEAT/egress training?	Υ	N
18	Do you suffer from motion sickness?	Υ	N
19	Are you claustrophobic?	Υ	N

Remarks

If my medical status should change during this course of training, I will immediately report my status to the lead HEAT instructor.

Handout 4

ITEM NO	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF
1.	Before	Cab Assembly	Visibly check for cracks dents and sharp edges	If cracked or sharp edges are found
	Before	a. Cab Mounts, and Retaining Bracket hardware	Loose, Missing or Damaged Hardware	Loose or missing or damaged hardware
	Before	b. Seatbelts	Loose, Missing or Damaged Hardware	Loose or missing or damaged hardware
	Before	c. Cameras	Check for cracks dirt or damage. Missing rubber protection bumper pads.	Cracked, Dirty or damage. Missing rubber protection bumper pads
	Before	d. BII Items	Check that all BII items are securely stowed	Un-stowed Items
	Before	e. Speakers and Microphone	*note requires two personnel Check speakers and microphone for loose or missing or damaged hardware and function correctly	Loose or missing or damaged hardware Not Function Properly
	Before	f. Doors, Windows and Gunner's Hatch	Check operation of doors, windows and gunner's hatch	Not Function Properly
2.	Before	Base Weldment	Visible check for cracks dents and sharp edges	If cracked or sharp edges are found
	Before	a. Gunner's cage Locking Pins	Loose, Missing or Damaged Hardware	Loose or missing or damaged hardware
				Not Function Properly
	Before	b. Inspect front AV Power Outlet	Loose, Missing or Damaged Hardware	Loose or missing or damaged hardware
				Not Function Properly
3.		Stand Weldment	Visible check for cracks dents and sharp edges	If cracked or sharp edges are found
	Before	a. Inspect Adjustable Lifting Point, PIN and Hardware	Loose, Missing or Damaged Hardware	Loose or missing or damaged hardware
				Not Function Properly
	Before	b. Side platform motion	Loose, Missing or Damaged Hardware	Loose or missing or damaged hardware
			Check binding and rolling out and in function	Not Function Properly
	Before	c. Side platform Steps and Leg Supports	Loose, Missing or Damaged Hardware	Loose or missing or damaged hardware
			Check binding and rolling out and in function	Not Function Properly
	Before	d. Side platform Roller	Loose, Missing or Damaged Hardware	Loose or missing or

ITEM NO	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF
_		Guilds and Supports Rollers		damaged hardware
			Check for serviceable Guilds and Rollers	Un-Serviceable
	Before	e. Side platform Locking Pins	Loose, Missing or Damaged Hardware	Loose or missing or damaged hardware
			Check Side platform Locking Pin function	Not Function Properly
4.	Before	Upper and Lower Cab Support Weldment	Visible check for cracks dents and sharp edges	If cracked or sharp edges are found
	Before	Inspect Screws washer and Nuts	Loose, Missing or Damaged Hardware	Loose or missing or damaged hardware
5.	Before	Gunner's Cadge Escape Slider Door	Loose, Missing or Damaged Hardware	Loose or missing hardware
			Open and Close Slider Door	Not Function Properly
6.	Before	Encoder	Loose, Missing or Damaged Hardware or Worn Belt	Missing or Damaged Belt
7.	Before	Front Operators Controls	Loose, Missing or Damaged Hardware	Loose or missing hardware
8.	Before	Batteries and Components		
	Before	a. Battery hold down straps and hardware	Check for missing or damaged battery hold down straps.	Missing or Damaged
	Before	b. NATO adapter and battery cables	Check for missing, loose, or damaged NATO adapter and battery cables	Loose, Missing or Damaged
	Before	c. Battery Box	Check for missing, loose, or damaged battery box	Loose, Missing or Damaged
	Before	Front Operators Controls Continued a. Function Test	WARNING This is done without Crewmembers in Cab Assembly. Failure to comply may cause injury or death to crewmembers	
			Attempt function Test	Not Function Properly
9.	During	Crew Display Panel	Check for open doors, battle over ride or e-stops display on panel	Not Function Properly
10.	During	Battery Bar Gauge	Check Battery bar gauge does not go below four bars.	Notify field Maintenance

ITEM NO	INTERVAL	ITEM TO CHECK/SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF
11.	During	Rotation	Check HEAT assembly for any unusual noise or excessive vibration during rotation.	Notify field Maintenance
12.	After	HEAT Assembly	Clean Entire HEAT Assembly	Inner Cab Debris
13.	Monthly	Gearbox Lubrication	Check For proper Fluid amount	Not Full
14.	Monthly	HEAT Assembly: Paint, BII and Rubber Protective items	Check for missing, loose, or damaged Paint, BII and Rubber Protective items	Damaged

HEAT Trouble Shooting

1. POWER WILL NOT TURN ON

Step 1. Check position of master power.

Set master power to ON position.

- Step 2. Check power cable (110v.220v.) is connected to power source properly.
 - a. Connect power cable.
 - b. Check that battery cables are tight.
- Step 3. Check batteries gauge for low bar displayed.
 - a. If gauge will not display any bars, check that battery cables are tight.
 - b. If none of these steps correct the malfunction, set master power to OFF position and notify supervisor.

END OF TESTING

2. CAB ASSEMBLY WILL NOT ROTATE

- Step 1. Check that power light is on and battery gauge displays four plus bars.
 - a. If gauge will not display any bars.
 - b. Check that motor power is in the ON position
- Step 2. Check crew display panel for any open door switch displayed on panel.
 - a. Reopen and close all doors completely.
 - b. Use combat lock override
- Step 3. Check crew display panel for any E-stop engaged on panel.

Check that E-stops are pulled to the full open position.

- Step 4. Check all cable connections for damage or loose connections.
 - a. Report any damage to supervisor.
 - b. Tighten all connections.
- Step 5. Check for obstructions between cab assembly and platforms.
 - a. Remove obstruction.
 - b. If none of these steps correct the malfunction, set master power to OFF position and notify supervisor.

END OF TESTING

3. CREW DISPLAY PANEL WILL NOT TURN ON

- Step 1. Check all cable connections for damage or loose connections.
 - a. Set master switch to ON position.
 - b. Check for any visible damage.
 - c. Tighten all connections.

d. If none of these steps correct the malfunction, set master power to OFF position and notify supervisor.

END OF TESTING

4. CAMERAS ARE NOT DISPLAYING ON CREW DISPLAY PANEL

- Step 1. Check all cable connections for damage or loose connections.
 - a. Check for obstruction over camera lens.
 - b. Check for any visible damage.
 - c. Tighten all connections.
 - d. If none of these steps correct the malfunction, set master power to OFF position and notify supervisor

END OF TESTING

5. SPEAKERS AND MIC'S ARE NOT WORKING

- Step 1. Check all cable connections for damage or loose connections.
 - a. Check for any visible damage.
 - b. Tighten all connections.
- Step 2. Check mic toggle for damage.
 - a. Mic toggle should spring back to off position. (Front operator's only)
 - b. If none of these steps correct the malfunction, set master power to OFF position and notify supervisor

END OF TESTING

6. DEGREE ON CREW DISPLAY PANEL DOES NOT CHANGE

- Step 1. Check all cable connections for damage or loose connections.
 - a. Check for any visible damage.
 - b. Tighten all connections.
- Step 2. Check the encoder belt.
 - a. Check encoder drive belt for cracks and deterioration
 - b. If wear appears to be excessive, set master power to OFF position and notify supervisor.

HEAT Operations

Note Unauthorized activation of the HEAT may endanger life.

Only certified trainers may operate the HEAT. HEAT operators must be trained and certified by personnel. As such, commanders must determine who is qualified to train the HEAT operator(s). Commanders may assign other competent personnel (military, civilian employees, or contractors) as HEAT operators/trainers. Ideally, someone who is already a master driver trainer or has experience as an instructor or safety officer/NCO may be designated by the commander as a HEAT operator/trainer. Operator/trainer must be selected not only for their technical qualifications but also for their demonstrated performance, objectivity, and ability to observe and provide constructive comments.

The operator before operating HEAT must:

- Read and be familiar with the HEAT Training Support Package (TSP)
- Review the HEAT Risk Management Worksheet (see Appendix
 D) and make any local expansions necessary for compatibility with
 the unit mission essential task list (METL).
- Ensure the HEAT preventive maintenance checks and services (PMCS) and prescribed maintenance are performed (see App D).
- Ensure communications are established in case of emergency.
- Ensure whistles, air horn, or similar signal device are onsite.
- Ensure a Combat lifesaver (CLS) and lifesaver/first aid equipment are onsite.
- Ensure following motion sickness supplies (medical/hazardous waste)are onsite:
 - (1) Shop (wet/dry) vacuum.
 - (2) Hose and water source.
 - (3) At least two one-gallon pails.
 - (4) Latex (or equivalent) gloves.
 - (5) Shop rags/towels.
 - (6) Motion sickness bags.
 - (7) A self-closing trash can and plastic trash bags.
- Ensure the recommended knee-pads and elbow-pads are onsite.
- Ensure safety glasses or goggles (mandatory for eye injury abatement).

- Ensure a fire extinguisher (Class A, B, C at least 10 lb) is onsite.
- Ensure flashlights (at least two) are onsite.
- Ensure that the BII is on hand (simulated ammo cans, cargo, etc.).
- Ensure hazardous material absorbent material is on hand to recover any oil and/or grease that may leak from the HEAT device and/or to clean up the effects of motion sickness.

The operator must perform the following task prior to conducting training on HEAT.

- Conduct PMCS IAW PMCS Checklist
- Conduct Functional Test. Demonstrate rollover of device while empty Observe rollover rate and check for free-floating and unsecured obstacles within the device.

The operator must perform the following task during operation

- Ensure all the time that nobody is within the secured area during operation
- · Watch for visible signals from passengers.
- Be alert to stop operation immediately if required.
- Listen for untypical noises.
- Keep an eye on the equipment at all times.

Instructions for cases of emergency

- HEAT operator/trainer has to pay close attention to crew members.
- If a crew member signal to interrupt the rotation or shouts RESCUE, HEAT has to be brought to the starting position (0°) and crew members must be evacuated immediately.

Handout 6

Item	Instructions
1 through 4	Self Explanatory
5	Subtask relating to the mission or task in Block 1.
6	Hazards – Identify hazards by reviewing METT-TC factors for the mission or task. Additional factors include historical lessons learned, experience, judgment, equipment characteristics and warnings, and environmental considerations.
7	Initial Risk Level– Includes historical lessons learned; intuitive analyses, experience, judgment, equipment characteristics and warnings; and environmental considerations. Determine initial risk for each hazard by applying risk assessment matrix (Figure 1-1). Enter the risk level for each hazard.
8	Controls – Develop one or more controls for each hazard that will either eliminate the hazard or reduce the risk (probability and/or severity) of a hazardous incident. Specify who, what, where, why, when, and how for each control. Enter controls.
9	Residual Risk Level– Determine the residual risk for each hazard by applying the risk assessment matrix (Figure 1-1). Enter the residual risk level for each hazard.
10	How to Implement – Decide how each control will be put into effect or communicated to the personnel who will make it happen (written or verbal instruction; tactical, safety, garrison SOPs, rehearsals). Enter controls.
11	How to Supervise (Who) –Plan how each control will be monitored for implementation (continuous supervision, spot-checks) and reassess hazards as the situation changes. Determine if the controls worked and if they can be improved. Pass on lessons learned.
12	Was Control Effective – Indicate "Yes" or "No." Review During AAR.
13	Overall Risk Level – Select the highest residual risk level and circle it. This becomes the overall mission or task risk level. The commander decides whether the controls are sufficient to accept the level of residual risk. If the risk is too great to continue the mission or task, the commander directs development of additional controls or modifies, changes, or rejects the COA.
14	Risk Decision Authority – Signed by the appropriate level of command.

			For use of	For use of this form, see FM 5-19; the proponent agency is TRADOC.	in Symmy in the			
1. MSN/TASK Conduct HMMV	1. MSN/TASK Conduct HMMWV Egress Assistance Training (HEAT) training	iner (HEAT)	training	2a. DTG BEGIN	2b. DTG END	END	3. DATE PREPARED (YYYYMMDO)	NAMBOJ
4. PREPARED BY	, .							
a. LAST NAME			b. RANK		c. POSITION			
5. SUBTASK	6. HAZARDS	7. INITAL RISK LEVEL		8. CONTROLS	9. RESIDUAL RISK LEVEL	10. HOW TO IMPLEMENT	11. HOW TO SUPERVISE (WHO)	12. WAS CONTROL EFFEC- TIVE?
	Adverse weather rain, lightning, cold, heat.	×	Obtain weal students hav	Obtain weather/wet bulb report. Ensure students have gear for season.		Conduct safety briefing prior to training.	Operator/Instructor	
Mounting or Dismounting HEAT	Trips, falls and impact caused by swinging HEAT cab	Ξ	HEAT mast with a positi	HEAT must be secure from rotation or sway with a positive lock before Soldier	Т	Device has positive lock at multiple positions; 0, 90,180 degrees.	OIC, PI, or Safety preoperational inspection daily.	
Mounting or Dismounting HEAT	Fall and impact from stepping / elimbing up to enter / exit cab above ground	Ξ	Use steps or ladder	r ladder	ı,	Provide securable steps or ladder.	OIC, Pl, or Safety inspect for availability and serviceability.	
Mounting or Dismounting HEAT	Scrapes and cuts from sharp edges of HEAT body interior and exterior.	М	File or grind doors and tu interface with	File or grind all sharp edges on inside, passages, doors and turret. Any where a Soldier may interface with the device; mounting or	1	OIC, PI, or Safety inspects HEAT before use. Tags out edge and makes repairs before use.	OIC, PI, or Safety inspect before and after operation and tags out sharp edge with sufficient protection.	
Rotating HEAT	Fall / ejected from HEAT	Ξ	Use and che and latches	Use and check the seat belts and door locks and latches	×	Inspect belts, locks and retractor before and after each rotation with Soldiers.	OIC, PI, or Safety inspects before and after each rotation.	
Rotation of HEAT	Injuries sustained from loss of motor control or braking	н	Inspect and system for p	nepect and service motor drive and brake system for potential failure.	×	Pre-operational inspection checklist	OIC, Pl. or Safety conducts pre-operations inspection.	
		Ad	fditional spar	Additional space for entries in Items 5 through 11 is provided on Page 2.	1 is provided	on Page 2.		
13. OVERALL RIS	OVERALL RISK LEVEL AFTER CONTROLS ARE IMPLEMENTED (Chack one) LOW MODERATE HIGH	ARE IMPLEMEN	NTED (Check o	k one) BH EXTREMELY HIGH	нон			
14. RISK DECISION AUTHORITY	W AUTHORITY							
a. LAST NAME		b. RANK	o	c. DUTY POSITION		d. SIGNATURE	URE	

12. WAS CONTROL EFFEC. TIVE?	_	50.	78					
11. HOW TO SUPERVISE (WHO)	OIC, Pl, or Safety confirms presence of medical response.	OIC, PI, or Safety inspections before operations	OIC, PI, or Safety inspections before operations					
10. HOW TO IMPLEMENT	Arrange for proper level of medical response either by the installation or unit. Part or pre-ops checklist.	Make part of check list for before operations training.	Pre-operational inspection of floor protection before operations.				A	
9. RESIDUAL RISK LEVEL	×	M	-1				12	
8. CONTROLS	First Aid personnel or Combat Lifesaver are present before and during rotation.	Ensure seat belts are serviceable, secure, and tight. Rotate HEAT Slowly.	Use foam or rubber mating to reduce injuries from falls.					
7. INITIAL RISK LEVEL	Н	н	M				- 15	
6. HAZARDS	Serape, cuts, bruises, neck, back, finger injuries.	Scrape, cuts, bruises, neck, back, finger injuries.	Injuries sustained from falling out onto hard floor.					
5. SUBTASK	Rotating HEAT	Rotating HEAT	Dismonating HEAT					

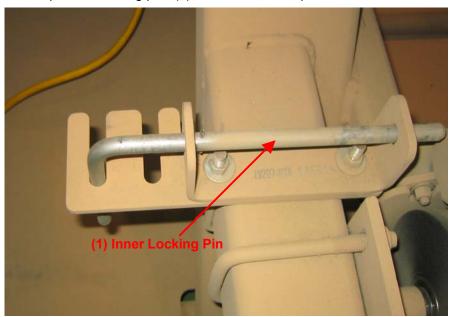
			COMPOS For use of this	COMPOSITE RISK MANAGEMENT WORKSHEET For use of this form, see FM 5-19; the proponent agency is TRADOC.	T WORKSHI	EET ADOC.		
1. MSN/TASK			2a.	2a. DTG BEGIN	2b. DTG END	END	3. DATE PREPARED (YYYYMMDD)	(MMDD)
4. PREPARED BY								
a. LAST NAME			b. RANK		c. POSITION		n	
5. SUBTASK	6. HAZARDS	7. INITIAL RISK LEVEL		8. CONTROLS	9. RESIDUAL RISK LEVEL	10. HOW TO IMPLEMENT	11. HOW TO SUPERVISE (WHO)	12. WAS CONTROL EFFEC- TIVE?
					5.2			
				201 201	# 50+3 · 4			
				2 ×				
Additional space for 13 OVERALL RISK LEVEL AFTER CONTROLS ARE IMPLEMENTED (Check one)	I AFTER CONTROLS	ARE IMPLEMEN	dditional space f	Additional space for entries in Items 5 through 11 is provided on Page 2.	1 is provided	on Page 2.		
LOW LOW	MODERATE	TE	HIGH	EXTREMELY HIGH	HIGH			
14. RISK DECISION AUTHORITY								
a. LAST NAME		b. RANK	.s. DI	c. DUTY POSITION	5.000 5.000 5.000 6.000	d. SIGNATURE	URE	
DA FORM 7566, APR 2005	3 2005							Page 1 of 2 APD PE v2.00

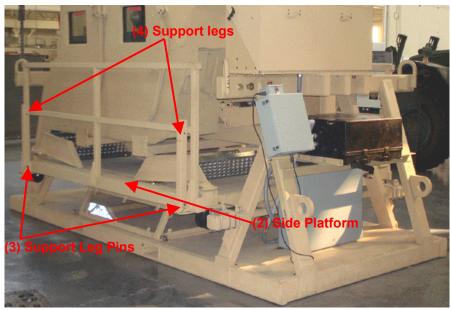
HEAT pre-operational use and set-up procedures

NOTE

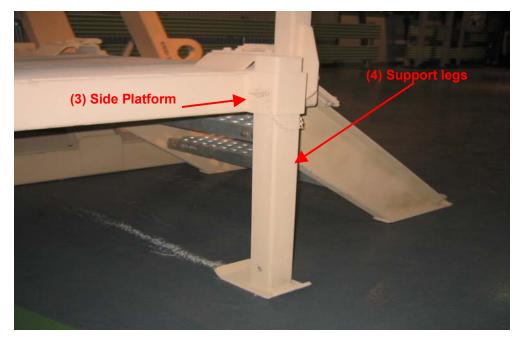
Only one platform is shown below. The side platforms are identical on both sides. This procedure covers the platforms setup. Only one platform locking pin location is shown below. The locking pins are both located to the left and right sides of the platform.

1. Remove two inner platform locking pins (1) from each side of platforms.

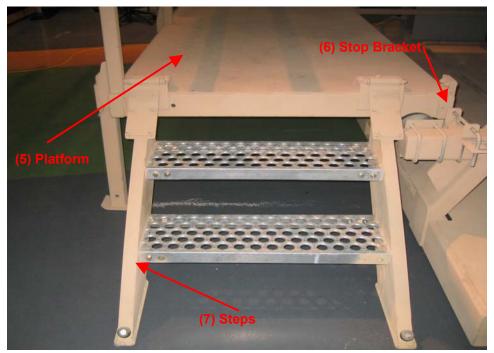




- 2. Remove pins (3) from support legs (front and rear) (4).
- 3. Lower support leg (front and rear) (4) so upper hole on leg aligns with hole on side platform (3).



4. Install pin though side platform (3) and support leg (4).



NOTE

All support legs and steps are raised and lowered in the exactly same way. The support legs and steps are shown in the lowered position.



Side Platform (Outward Position)

- 5. Using both personnel grasp each end of platform (5) and pull outward until fully extended to stop bracket (6).
- 6. Grasp steps (7) and rotate to ground.

Side Platforms Stowed/Platforms are in the outward position

1. Grasp steps (7) and rotate steps on to platform.

NOTE

Only one platform is shown below. The side platforms are identical on both sides. This procedure covers the platforms setup. Only one platform locking pin location is shown below. The locking pins are both located to the left and right sides of the platform.

2. Using both personnel grasp each end of platform (5) and push inward until the platform is fully under cab assembly (6).

NOTE

All support legs and steps are raised and lowered in the exactly same way. The support legs and steps are shown in the lowered position.

- 3. Remove pin inside platform (3) and support leg (4).
- 4. Raise support leg (front and rear) (4) so lower hole on leg aligns with hole on side platform (3).
- Replace pins (3) into support legs (front and rear) (4).
- 6. Insert two inner locking pins (1) in each side of the platforms.

Connect Power Cable Using 110v Wall Outlet

WARNING

All control switches must be in the off position before connecting power cord to wall outlet. Failure to place control switches in the off position may result in injury or death to personnel.



- 1. Check that master power switch/key (1) is removed from operator's control panel.
- 2. Check that E-stop (2) is pushed in.
- 3. Raise power inverter cover (3) and connect yellow power inverter cord (4) to inverter.
- 4. Place the power switch on the inverter and charger to the on position

WARNING

Ensure that the power outlet being used for the HEAT is powered by a minimum of a 15 amp circuit breaker. Failure to comply may result in injury or death to personnel or damage to equipment.

1. Connect power extension cord (4) to 15 amp 110v wall outlet.

